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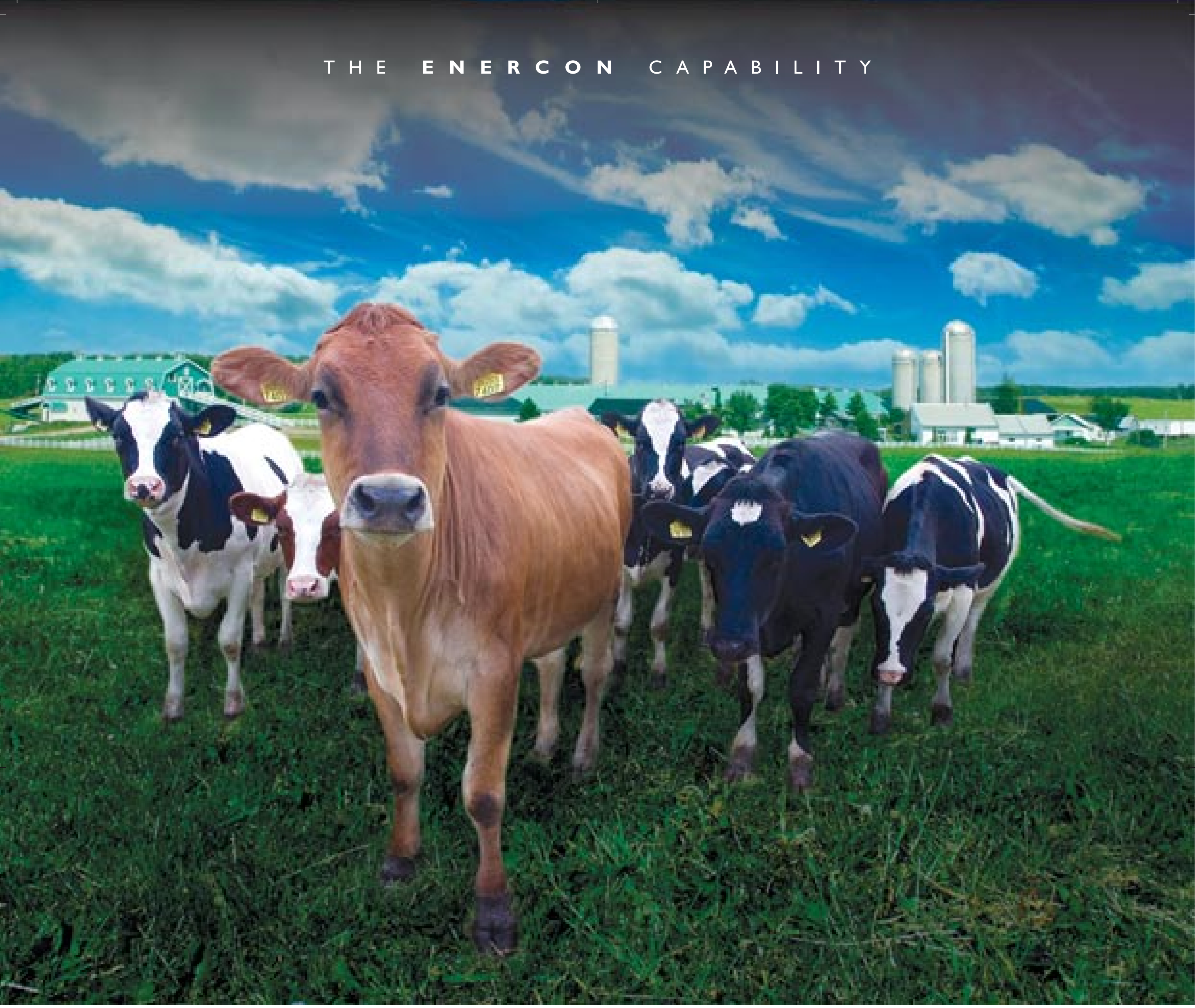

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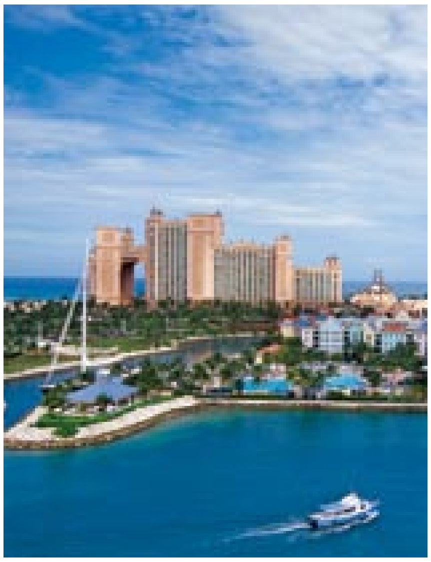

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POWER-GEN International 2008

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Look for more industry events in our up-to-date calendar on the web at *www.EGSA.org*. *EGSA Members*: To list your meetings here, fax your information to (561) 395-8557.

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Powerline is published six times per year on a bi-monthly basis. Articles and information submitted for publication should be forwarded to the attention of the Editor at the address above 30 days prior to publication. Technical articles and articles of general interest to the electrical generation industry are actively sought and encouraged. *Powerline* reserves the right to limit information appearing in its pages to that which, in its sole discretion, will reflect positively on EGSA and the industry which it serves.

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Electrical Generating Systems Association
1650 S. Dixie Highway, Suite 500
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561/750-5575 • Fax 561/395-8557
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Warner Bauer
2008 EGSA President

Is the Market Beginning to Respond?

Amidst all the discussion about the rising price of petroleum and petroleum byproducts, it's hardly surprising that there's been a growing interest in alternative fuels, green technologies, fuel efficiency and cogeneration.

I don't have any hard numbers—call it gut instinct—but I can tell you that my firm is currently working at full capacity. From what we know, it looks like we are getting the largest share of waste heat recovery equipment orders and our deliveries on new orders are now January 2009.

If you're not familiar with the term, the EGSA *On-Site Power Reference Book* defines cogeneration as "the simultaneous production of electricity and either steam or high temperature hot water that is used for a beneficial purpose."

While cogeneration installations can be as small as a 5kW residential system that uses the waste heat from a small generator to heat domestic hot water, cogeneration is more commonly seen in larger plants such as hospitals and university campuses where the waste heat is recovered to heating or even cooling.

This growing interest in cogeneration is likely due to several factors. First, the Public Utility Regulatory Policy Act (PURPA) is relevant again. The Act was passed in 1978 during a similar energy crisis where oil prices were predicted to hit $100 a barrel. Congress passed the act in an attempt to reduce our dependence on foreign oil, promote alternative energy sources and energy efficiency, and diversify the electric power industry.

The Act also allowed non-utility power producers to enter the market. Before PURPA, only utilities could own and operate electric generating plants. Over the years, PURPA has been credited as the most effective single measure in promoting renewable energy. Most industry professionals would agree PURPA's biggest beneficiary, however, has been natural gas-fired cogeneration plants. Now that the price of oil is climbing again, perhaps PURPA is more relevant today than it was two years ago.

The second factor may be the Bush Administration's laissez-faire attitude concerning the reduction of carbon emissions. As the Union of Concerned Scientists (*www.ucsusa.org*) has said, "….as long as fossil fuel price forecasts are low, there will be very little development of new renewable energy."

In a March 2001 letter to Senators Hagel, Helms, Craig, and Roberts outlining his opposition to the Kyoto Protocol, President Bush said the treaty "exempts 80 percent of the world, including major population centers such as China and India, from compliance, and would cause serious harm to the U.S. economy."

Instead, President Bush pledged to "work with the Congress on a multipollutant strategy to require power plants to reduce emissions of sulfur dioxide, nitrogen oxides, and mercury. Any such strategy would include phasing in reductions over a reasonable period of time, providing regulatory certainty, and offering market-based incentives to help industry meet the targets."

Reluctant to stifle growth, President Bush opted instead to allow market pressures to move the economy in the direction of green technologies. Granted, this has been a painful decision for all of us. Gas prices are skyrocketing, inflation is rising, unemployment is creeping higher, businesses are cutting back—petroleum prices are pushing everyone's buttons. But there is light at the end of the tunnel. Already market-based solutions to the gas crisis are beginning to emerge. Mass transportation ridership is up, drivers are increasingly turning in their SUVs for smaller cars and ultra-efficient hybrids and biofuel consumption is increasing.

It may take a little time to get over the hump but innovation and determination will get us there. Power professionals should keep a sharp eye out for these emerging market opportunities. Are you prepared for even higher petroleum prices? ■

George Rowley
EGSA Director
of Education

Education Committee to Engage in Long Range (5 Year) Planning

At its upcoming meeting in Atlanta, the Education Committee will initiate a process of planning for the future. This is important to you because the committee exists solely to meet member and industry education needs. The committee description is: “Develops and monitors training courses, oversees the On-Site Power Schools curricula and performance, and implements new educational programs. Develops and updates an improved 5th Edition of *On-Site Power Generation: A Reference Book* with guidance and input from the EGSA membership.”

Please note that the key operational phrase in the description is “*…with guidance and input from the EGSA membership.*” We do listen and carefully consider your ideas and suggestions.

The importance of your guidance and input is evident in the revised on-site power school curriculum implemented this year. Not only did we consider industry and technology changes that have occurred since the school was last revised, we also evaluated five or six years worth of student feedback, comments, rankings and data to make sure we were doing what needed to be done.

We hope you’ll see even more evidence of the importance of member input when the new edition of the *On-Site Power Reference Book* is published. The amount of input and ideas from members in this new version of the “Bible of the On-Site Power Industry” is unprecedented and invaluable. We began collecting comments about book content upon publication of the current Fourth Edition in 2002. Furthermore, since that time, we have conducted at least two member surveys and convened several meetings of focus groups consisting of members from most corners of the industry. And several committees have spent many hours pondering your ideas and suggestions as well as those of the focus groups.

What does the future hold for EGSA’s education programs? In many cases the answer to that question might depend on what you have to say. Although there are several potential projects on our list for consideration and discussion, two of them will really need your input and guidance if it proves that they are worthy of development: On-line Learning and a Sales and Marketing Certification program.

On-line Learning (e-learning) programs are those which would be available 24/7 over the Internet. As we engage in the problem-solving and decision-making processes for this project we will be looking for your general input and will especially need your ideas as to what type of courses you want and need.

A Sales and Marketing Certification program was one element of a proposed overall plan for certification programs when the Technician Certification program was proposed. You may recall member surveys conducted in 2002 and 2003 that skirted this idea. The idea was placed on a “back burner” to gain experience with certification programs and to enable the technician certification program to “get legs.” Obviously, if we go ahead with this program, we will need member-at-large input and guidance and active participation from members who have a passion for this issue. Stay tuned for more on this later!

Comments or questions about EGSA Education programs should be directed to George Rowley, EGSA Director of Education (*G.Rowley@EGSA.org* or 561-237-5557). ■

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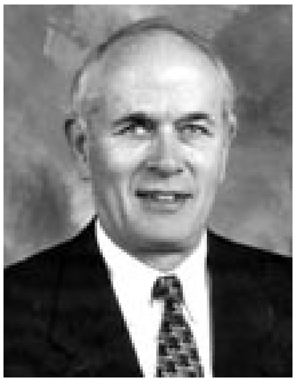

Herb Whittall
EGSA Technical Advisor

It's Easier to Be Green

Being Green is becoming more fashionable and is increasingly being incorporated into codes. The June 2008 *Building Safety Journal* issued by the International Code Council previews ICCC 700-2008 National Green Building Standard (NGBS), which is in the approval process. The standard rates the environmental impact of buildings with regards to water, land, materials used and energy conservation. This same issue announces that the National Electrical Contractors Association (NECA), which issues electrical installation standards, has joined the U. S. Green Building Council. All of this means that in the not too distant future, the overall efficiency of the standby power system will be looked at when a building is certified "Green" or to see if it qualifies as a LEED building. Even the June 2008 issue of *Pollution Engineering* has an article on how much energy is wasted because computers are not powered down or put in "sleep" mode when they are not being used. According to the article, the EPA launched its Energy Star Low Carbon IT Campaign this April to spread the message that the U.S. would save more than 44 billion kWh if we all shut off our computers. Perhaps there will be more standards regulating energy use.

Arc-flash Hazard

Arc-flash hazard has become a topic of discussion over the last couple of years. IEEE Standard 1584-2002 was written as an attempt to allow engineers to model installations to quantify the hazard. However, IEEE Standard 1584-2002 has not been universally accepted and approved as the authors had hoped during its development. The July/August issue of *IEEE Industry and Applications* has a lengthy article discussing methods of modeling the arc-flash hazard. It is a reprint of an article by Tammy Gammon and John Matthews of John Matthews and Associates that first appeared as "The IEEE 1584-2002 Arc-Modeling Debate and Simple Incident Energy" at the 2006 Industrial and Commercial Power Systems Technical Conference. Those who have to examine installations for arc-flash hazards should have a look at this helpful article.

NFPA Seminars

The NFPA puts on seminars around the country to allow employers to send their employees to be updated on the latest changes to the codes. There are 10 of these in the last quarter of 2008. To find out the dates and locations of these seminars either call 1-800-344-3555 or log on to *NFPALEARN.org* for information and to register.

ISO and UL Standards

ISO 8178-4:*2007 Reciprocating internal combustion engines – Exhaust emission measurement – Part 4: Steady-state test cycles for different engine applications* has been published and is available through ANSI Customer Service Phone 1-212-642-4500; email *quote@ansi.org* or *webstore.ansi.org*.

ISO 4548 – 6 Methods of test for full-flow lubricating oil filters for internal combustion engines – Part 6. Static burst pressure test is under revision and will be discussed at the October meeting of the committee in Milan, Italy. The changes are essentially changing the pressure figures from bars to kPa.

UL Standards 1564 Ed.3 – Standard for industrial battery chargers and UL Standard 1236 Ed 3 Standard for Battery Chargers for Charging Engine-Starter Batteries. Both standards were open for review in July, but have closed. For more information concerning UL 1564, contact Vickie Hinton at 919-549-1851 and for UL 1236 contact Jonette Herman at 919-549-1479.

Alternate Fuel

You may have heard of Jatropha oil. It comes from the inedible fruit of the Jatropha tree. This tree can grow in quite inhospitable soil and dry weather and as such it does not take up crop land. A Wärtsilä engine in Merksplas, Belgium is being installed and will use this oil starting in February, 2009. There currently are no standards for this oil, but if this engine works reliably using Jatropha oil, I am sure others will need to adapt their engines to use it as well. ■

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Meet the David I. Coren Scholarship Recipients for 2008-2009 Academic Year

The Electrical Generating Systems Association (EGSA) Scholarship Committee has completed its review of credentials and ranking of applications and, at the direction of the EGSA Board of Directors, has awarded eleven $2,500 scholarships for the 2008-09 academic year.

The David I. Coren Scholarship Program provides financial assistance to qualified students and is designed to have a positive impact on personnel shortages in our industry and will be an excellent vehicle for enhancing awareness of the industry. The competitive, merit-based scholarships are awarded to qualified students who plan on pursuing a career in the On-Site Power industry. In addition to their career focus, applicants must be full-time students, have a declared major related to On-Site Power, and maintain a minimum 2.8 GPA.

EGSA launched the David I. Coren Scholarship Program in 2002 to promote awareness of the On-Site Power Generation industry and to generate interest in On-Site Power careers. The move came in response to the growing need for skilled On-Site Power personnel. While the Association has an established and widely recognized On-Site Power School education program of its own, the Board of Directors noted the industry's need for individuals with higher educations from a variety of applicable disciplines.

Information detailing the David I. Coren Memorial Scholarship program—including a Scholarship Program Brochure and an Application Packet—is available on the Association's web site at *www.egsa.org*. For additional information, individuals may contact George Rowley, EGSA Director of Education, by e-mail at *g.rowley@egsa.org* or by phone at 561-237-5557.

About David I. Coren

David joined both Zenith Controls and EGSA in the early 1990's. He became Chairman of EGSA's Convention Planning Committee in the mid 1990's, and his strong leadership led to many exciting convention programs. In 1999, EGSA recognized his contributions to the Convention Program Planning Committee by honoring him with the William Timmler Award.

David held several executive positions at Zenith Controls including Manager of Business Development, and Vice-President. He became President of Zenith in the late 1990's and held that position until the company was sold to General Electric at the end of 1999. David's integrity, honest and direct approach, and caring attitude earned him the respect of all the employees at Zenith, as well as throughout our industry. David passed away in the fall of 2000, leaving a lasting legacy of EGSA leadership.

Continued on page 14

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Patrick R. Hartung

Fox Valley Technical College

Degree/Major: AAS/Diesel Technology & EPG

When I was first informed about the Electrical Power Generation (EPG) industry I was already headed to Fox Valley Technical College in Appleton, WI to enter their Diesel Technology program. Once there, I began to pursue my interests, enrolled in EPG, obtained a GPA of greater than 3.5 and have been recognized on the Dean's list every semester. I am currently working for FABCO Power Systems as an EPG Technician and plan to continue my education for a Bachelor's degree in Business Administration. I could not have accomplished so much without the support of my parents (Bernard and Rosanne), girlfriend (Laura Nigon) and instructors (Chris Jossart, Dan Poeschel, and Joe Berhausen). I would like to extend personal appreciation to the Electrical Generating Systems Association (EGSA) for this wonderful award.

Kathryn A. Illum

Idaho State University

Degree/Major: AAS/Energy Systems Inst & Ctrl Eng. Technician

I am attending Idaho State University College of Technology in the Energy Systems Instrumentation and Controls Engineering Technology Program. I hope to receive an Associate Degree in Applied Science in May of 2010. I graduated from Stevens Henager with a cumulative GPA of 3.83 and was honored at that school when I was nominated for the Junior College of Who's Who in 1996.

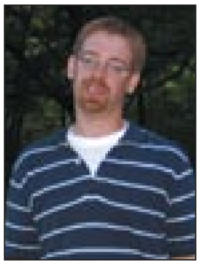
I am proud to have served my country in the United States Army; I was stationed in Germany. I am extremely involved with my community and have spent many hours volunteering in many capacities. My personal goal is to become fully self supporting for myself and my family. I love the challenges that life presents and find learning extremely rewarding. I am extremely honored to receive this award, and I look forward to being affiliated with EGSA.

Andrew D. Kleckner

Universal Technical Institute

Degree/Major: Certificate/EPG

My name is Andrew Kleckner. I grew up in Omaha, NE, and I have worked in the automotive field for four years. I decided to attend the Universal Technical Institute where I studied Automotive and Diesel technology. During my student career, I received five "student of the course" awards (best student of the class of 3 weeks), "excellent attendance" award and director's list, plus the alpha kappa beta award. My GPA was 3.9. Later I attended a Cummins Power Gen class in Phoenix, AZ where I obtained many certifications that usually take years in the field to get. I am very grateful for the scholarship. Thank you.



Wade A. Kuhl

Fox Valley Technical College

Degree/Major: AAS/EPG

My name is Wade Kuhl. I am 29 years old and live in New Glarus, WI. For the past year I have been attending classes at Fox Valley Technical College in Oshkosh, WI. I am enrolled in the Fabtech program at FVTC studying electric power generation, holding a 4.0 GPA. By this time next year I hope to have earned an Associate Degree and then continue on to get my Bachelor's Degree, which will help me grow within Fabco Caterpillar, my future employer. To be able to dedicate the kind of time and effort that I have put into my education, I have received tremendous support from my parents Gary and Jane, my fiancee Becky, my CAT instructor Joe Berhausen, and my electronics instructor Tom Yapp. I also need to give an enormous thank you to EGSA for awarding me the David I. Coren Memorial Scholarship.

Matthew C. Loucks

Ohio Technical College

Degree/Major: Certificate/EPG

My name is Matthew (Matt) Loucks. I am from Oneida, NY. I attend Ohio Technical College in Cleveland, OH. I will receive a diploma in Diesel Equipment Technology and a certificate in Generator Power Systems when I graduate in April 2009. I received several scholarships from OTC including the Roger Penske Scholarship, Certificate of Outstanding Achievement Scholarship, and New York Skills USA Diesel Technology Scholarship. I also received an Imagine America Scholarship and several local scholarships. I'd like to thank EGSA Member Dan Poeschel. He has been very influential in my pursuit of a career in Electric Power, and his support has meant a great deal to me. I was a member of the National Technical Honor Society, participated in Skills USA, and received Certificates of Academic Achievement while attending Rossetti Career & Technical Education Center in Verona, NY. My hobbies include farming, all terrain vehicles, snowmobiles, small engine repair, trucks, and large equipment. I work at The Tractor Place in North Royalton, OH where I service and repair equipment and small engines.

Clifford G. Milner

Clemson University

Degree/Major: BS/Mechanical Engineering

My name is Glenn Milner and I attend Clemson University in South Carolina where I am studying mechanical engineering. I will graduate in December of 2009 and am currently co-oping at General Electric in Greenville, SC designing and manufacturing gas turbines. I am also involved with Campus Crusade, IPTAY collegiate club, intramural sports, and I serve as president of Pi Tau Sigma which is the mechanical engineering honor society. After college I plan to gain a few years of work experience and then return to school to get my MBA.

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Kenneth C. Schmitigal

Ferris State University

Degree/Major: BS/Heavy Equip. Svc. Eng. Tech

My name is Kenny Schmitigal and I am from Hartland, MI. I am enrolled at Ferris State University in Big Rapids, MI. I plan to graduate with a four year Bachelor Degree in Heavy Equipment Service Engineering Technology. I graduated high school with a 3.39 GPA. I received the Promise Scholarship from the Michigan Merit Exam, and the Dean's scholarship from Ferris State University. I would just like to thank everyone involved in EGSA for making it possible for me to further my education in the power generation industry.

David M. Vander Ark

North Dakota State University

Degree/Major: BS/Electrical Engineering

After graduating from Woodrow Wilson High School, I attended Minnesota State Technical College in Moorhead where I graduated from the Construction Electricity program with highest honors. I am now continuing my education at North Dakota State University in Fargo and on my way to earning an Electrical Engineering degree. I earned a spot on the Dean's list in 2007 with a 4.0 G.P.A. I am employed part time by KVA Engineering of Hamel, MN installing industrial machinery. I am engaged to a first grade teacher, and we plan on buying a house in a few years and beginning a family. Thank you to the Electrical Generating Systems Association as well as the David I. Coren family for the generous support through this scholarship.

Robert W. Wagner

Universal Technical Institute

Degree/Major: Certificate/EPG

My name is Robert Wayne Wagner. I'm 20 years old and originally from Fresno, CA. I recently completed Cummins Manufacturer Training at Universal Technical Institute in Phoenix, AZ, as a sponsored student with the help of a generous scholarship from EGSA. I became interested in power generation while working for EC Power Systems in Denver, CO and attending Denver Auto and Diesel College where I earned valedictorian and perfect attendance awards. I am beginning my career as a generator technician with Cummins Rocky Mountain in Billings, MT, and I look forward to an exciting and long career in power generation.

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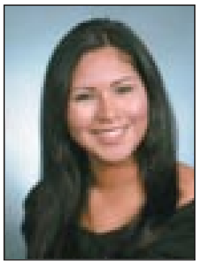

Diana C. Wiener

Ohio Technical College
Degree/Major: Certificate and AAS/ Diesel & EPG

My name is Diana Wiener. I am from Milltown, NJ and I currently attend Ohio Technical College. The power generation industry has always interested me. I started learning about the automotive and diesel industries when I was a young girl and developed a deeper interest in the diesel field. During high school I took night classes at a vocational school for diesel. While attending college I furthered my knowledge by getting a job in the diesel industry. I am currently working at Power City International as an entry level technician. I became even more interested in the generator field while attending Ohio Technical College and have started a three month course. I am a very motivated and determined woman. I love to learn, and I plan on becoming a mechanical engineer and owning a corporation. I have the skills and valued qualities to succeed in this field. I want to be known as someone and want to contribute to the growth of this continually changing industry.

Shane P. Wilcome

Ferris State University
Degree/Major: BS/Heavy Equipment Service Eng. Tech

My name is Shane Wilcome, I was born and raised in Northern Michigan just a short drive south of the Mackinac Bridge in a little town called Wolverine. I am currently a junior at Ferris State University, majoring in Heavy Equipment Service Engineering Technology. I just graduated with honors (3.67 GPA) and gained my Associate Degree in Heavy Equipment Technology. I recently won gold at the Michigan State Skills USA competition and then 21st place in Nationals. I play soccer for the FSU men's club team and I am the treasurer of our Heavy Equipment Association. Currently I work for Tilmann Hardware Inc. (a New Holland Agricultural Dealer) as a parts man. My ultimate career goal is to eventually become the service manager of a large power generation or heavy equipment company. ■

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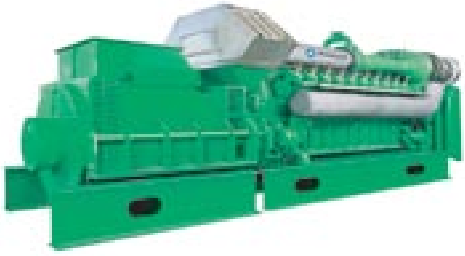

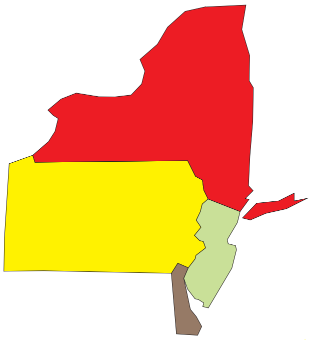

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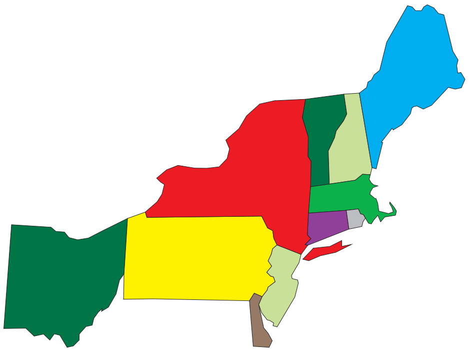

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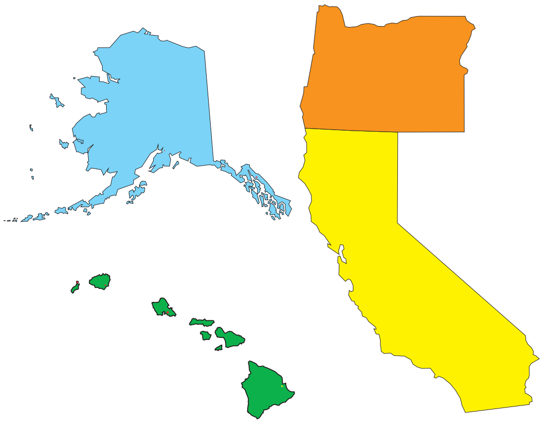

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Island Power Case Study

Against the Wind

Enclosures help safeguard island back-up power

By Randy L. Weimer, Vice President, Advanced Mfg. & Power Systems, Inc.

It happens every year: waves of thunderstorms roll off the coast of Africa and head west. Some will simply dissipate. A few, however, will gain in size and strength to become hurricanes. Securing facilities against such events is a matter of course in the tropics. And upscale vacation resorts often go the extra mile to ensure that their guests—and their operations—will be protected.

Proof of this can be found at the opening of the Atlantis Resort Hotel's recent Phase III expansion and Convention Center addition. The resort is located in the Bahamas on Paradise Island and is operated by Kerzner International Holdings Limited, a leading international developer and operator of destination resorts, casinos and luxury hotels.

As Kerzner's flagship brand, the stakes on the Atlantis, Paradise Island project were particularly high. The ocean-themed destination resort features a variety of accommodations, all built around a 100-acre waterscape with over 20 million gallons of fresh and saltwater lagoons, pools and habitats, the world's largest open-air marine habitat and some of the most beautiful beaches in the world.

The Atlantis Phase III expansion was large and highly complex. Project components included:

- A 600 room luxury all-suite hotel.
- A 400 unit condo hotel with pre-sales started back in 2005.
- Major expansion "of Disney proportions" to the water-based attractions, including a dolphin encounter program and first-of-its kind water rides.
- Over 100,000 square feet of additional floor space for group meetings and conventions.
- The Marina Village, retail and dining set in a colonial Bahamian village surrounding the Atlantis Marina which was completed in the fall of 2005.
- Harborside Resort at Atlantis Timeshare Phase II expansion completed in mid 2005.
- Spectacular 18-hole links golf course on adjacent Athol Island with ferry access nearing completion.
- New restaurants including Bobby Flay's Mesa Grill, named New York's best by New York Magazine in 2004; Nobu, a Japanese restaurant conceived and run by Chef Nobu Matsuhisa; and the return of the legendary Café Martinique with Jean-Georges Vongerichten.
- Ocean Club estates—80 luxurious 3-bedroom condominium residences and eight exclusive 4-bedroom penthouses ranging from 3,000 to 7,200 square feet.
- Ocean Place on the Harbor—79 two- and three-bedroom condominiums with harbor or golf course views.
- Dolphin Cay—home to 16 displaced Katrina Dolphins and the first rescue and rehabilitation facility in the Bahamas.

Advanced Manufacturing & Power Systems, Inc. (AMPS) packaged seven Mitsubishi-powered 2MW generator sets along with two switchgear enclosures for Boca Power Systems for the Atlantis Phase III site. We also packaged two Mitsubishi powered 1.5MW generator sets for Boca Power Systems for the Atlantis Convention Center. Both installations were designed to guarantee a perfect holiday without the loss of electric power and its conveniences.

The generator sets were brought to our DeLand, FL facility, set onto fabricated UL-142 sub-base day-tanks and fitted with fabricated aluminum enclosures. All of the units were then up-fitted with electrical and mechanical options per the customer's specifications. After completion, the units were shipped to South Florida and loaded onto barges for the trip to Paradise Island. The units were offloaded directly on the beach and trucked to the site where our technicians helped with the final installation, set-up and commissioning of the generator sets.

The Phase III generator sets produce a total of 14 MW at 12,470 Volts and start on demand, supplying power to a "Loop Feed System" with Load Demand and Shedding as required. Each generator has its own 1,100 gallon sub-base day-tank and aluminum formed panel construction enclosure. The enclosures were designed and built to withstand hurricane wind loads of over 150mph and can also withstand large debris impact loads.

The 22' x 50' high voltage switchgear enclosure had to be assembled on site as it would have been impossible to ship it assembled. This enclosure was anchored directly to the concrete pad. The electrical along with two air conditioning units were also field installed by our technicians.

The generator control switchgear enclosure was shipped in two sections and consisted of a steel frame floor and the aluminum, formed-panel construction enclosure. This enclosure is also cooled with one wall mounted air conditioner. The switchgear has a set of back-up batteries and a charger housed inside the enclosure. A fuel monitoring system for the remote twin 80,000 gallon tanks was site installed to ensure proper fuel management, and the controller is housed just opposite the main switchgear inside the enclosure.

The entire system at the Phase III site is cleverly concealed within concrete walls to allow an uninterrupted view of the beautiful island surroundings. Bahamas Electric Power has a power station on site to provide proper distribution of the utility power which enhances the generator set installation as well as the utility distributed power.

For more information about AMPS, visit *www.amps.cc*. ■

The units were shipped to South Florida, loaded onto barges for the trip to Paradise Island, offloaded directly onto the beach and trucked to the site where technicians helped with the final installation, set-up and commissioning of the generator sets.

Healthcare Network Offers Glimpse of the Future of Back-up Power

Advances in healthcare technology require more electrical devices, such as those shown in this operating room at the Mary Imogene Bassett Hospital. The hospital's sophisticated emergency system ensures power is provided to critical equipment if the utility feed is lost for any reason, then returns full power to all other electrical receptacles minutes later.

Bassett Healthcare, based in Cooperstown, New York, is noteworthy not only for its top-quality patient care, but also for its self-sufficiency. With more than 270 physicians on the payroll (an unusual closed-group practice), Bassett operates a teaching hospital, a research institute, and a network of regional clinics serving eight counties in upstate New York. All of its 24 facilities are protected by emergency backup power systems that go beyond the capabilities of most other hospitals.

In August of 2003, when a surge of electricity to western New York touched off a massive blackout affecting eight states in the Northeast, Midwest, and parts of Canada, Bassett was an island of light in a sea of darkness—up and running on its backup system. The company's "flagship," the 180-bed Mary Imogene Bassett Hospital in downtown Cooperstown, played a key role by feeding the community, accepting refrigerated vaccines from county offices that had lost power, and providing other services for competing healthcare institutions that didn't have backup power.

Bassett is even more secure today, thanks to a 2004 upgrade/expansion that added generating capacity and more capabilities to its advanced emergency power system. Much of the credit goes to Joe Middleton. Middleton, Bassett's forward-thinking vice president for corporate support services and facilities planning, has a degree in electrical engineering and once taught at the university level. His knowledge and experience helped him guide Bassett's board of directors through some tough decisions and significant financial investments to the enviable position they find themselves in today.

"Power outages are common," says Middleton. "But it's not just a reliability issue; it's a matter of system redundancy – we're in a rural area with a single electrical feed and no natural gas service, so it became necessary to create our own secondary power source."

Although hospitals are required to have an emergency power system for critical loads, many are located in communities with a second source of normal power. Some are even served by two electrical utilities. The National Fire Protection Association (NFPA) code sees this as the ideal, stating: "For the greatest assurance of continuity of electrical service, the normal source should consist of two separate full-capacity services, each independent of the other." [NFPA 99 2005 ANNEX A.4.4.1.1.1]

Bassett employs 2800 people, more than the population of Cooperstown, and sees about 1000 outpatients a day on top of regular admissions. While management's first concern is how to provide the best patient care, reliable backup power has a fiscal benefit as well. Middleton estimates the loss of power for eight hours would amount to a revenue loss of $1,000,000.

Bassett isn't taking any chances. The default mode of the paralleling gear for their backup power system meets the requirements of the NFPA's National Electrical Code (NEC), providing emergency power to loads that supply critical services for life safety plus the HVAC system and some other equipment – the typical hospital emergency power system. However, that

With a self-sufficient emergency power system that exceeds the capabilities of most other hospitals, the Mary Imogene Bassett Hospital, in Cooperstown, New York, is the hub of Bassett Healthcare, which operates regional clinics as well. All of Bassett's 24 facilities use emergency switching equipment designed and built by Russelectric Inc.

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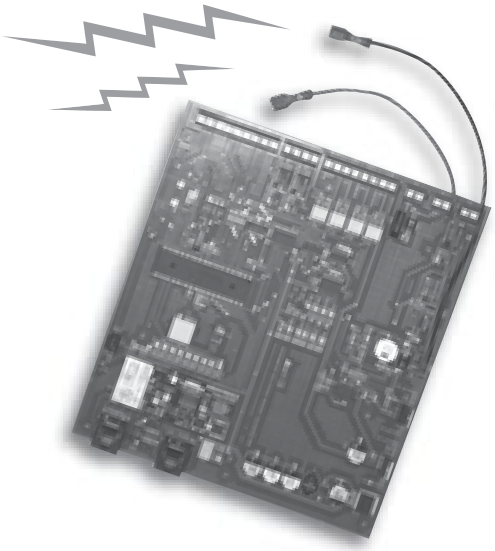

is only the beginning for Bassett's system, which ensures that all elevators will also keep running and then, five minutes after the beginning of the outage, ramps up two additional generators to restore full power to the hospital and 15 other buildings.

In an operating room, for example, this can make a big difference. The NEC says only a certain percentage of electrical receptacles (outlets) in an operating room (OR) must be on emergency power, not all of them. "You can't count on two hands the number of computerized devices in our cardiovascular OR," says Middleton. So at Bassett, five minutes after a power loss, not just the receptacles prescribed by code, but all receptacles are live again. At that point, Bassett facilities are energy independent, generating all their own primary power. The system can back-feed and feed around any fault on the campus.

But that's not all. Another backup system, entirely separate and distinct, ensures a continuous power feed to Bassett's data center, which is also on the Cooperstown campus. This system, which has its own redundancies, allows no power interruptions at all. These days, the loss of computer access to patient drug histories, digital radiology films, and other electronic records would be a serious setback for doctors, nurses, and ultimately patients.

An advocate for the extra backup he brought about at Bassett Healthcare, Middleton observes, "As healthcare technology becomes more and more sophisticated, concurrent with the increased focus on expense control, the continuous delivery of medical information is critical. A reliable power system really needs to be a bottom-line calculation. Unfortunately, most healthcare facilities have not realized this yet."

In the 1980s Middleton worked for the Carle Foundation Hospital in Illinois. When, as part of that hospital's expansion program, management decided to consolidate and centralize their power distribution system and parallel their sources of emergency power, Middleton was involved in the selection process for the design, manufacture, and installation of the necessary switchgear. Middleton recommended Russelectric when he came to Bassett Healthcare in 1988. The company was made its sole-source supplier for emergency backup power equipment.

Nowadays, whenever Bassett decides to design a new system or modify an existing one, it invites the manufacturer to sit in on all planning sessions, beginning at the very start of the preliminary planning phase. In 1990 and 1991, Bassett asked the manufacturer to design, build, and install switchgear synchronizing three 900 kW, 480 volt generator sets for the main campus in Cooperstown. Upon loss of utility voltage, this system starts and synchronizes the three generator sets, and automatic transfer switches transfer the emergency load to the generator source. Upon return of utility power, after a time delay to make

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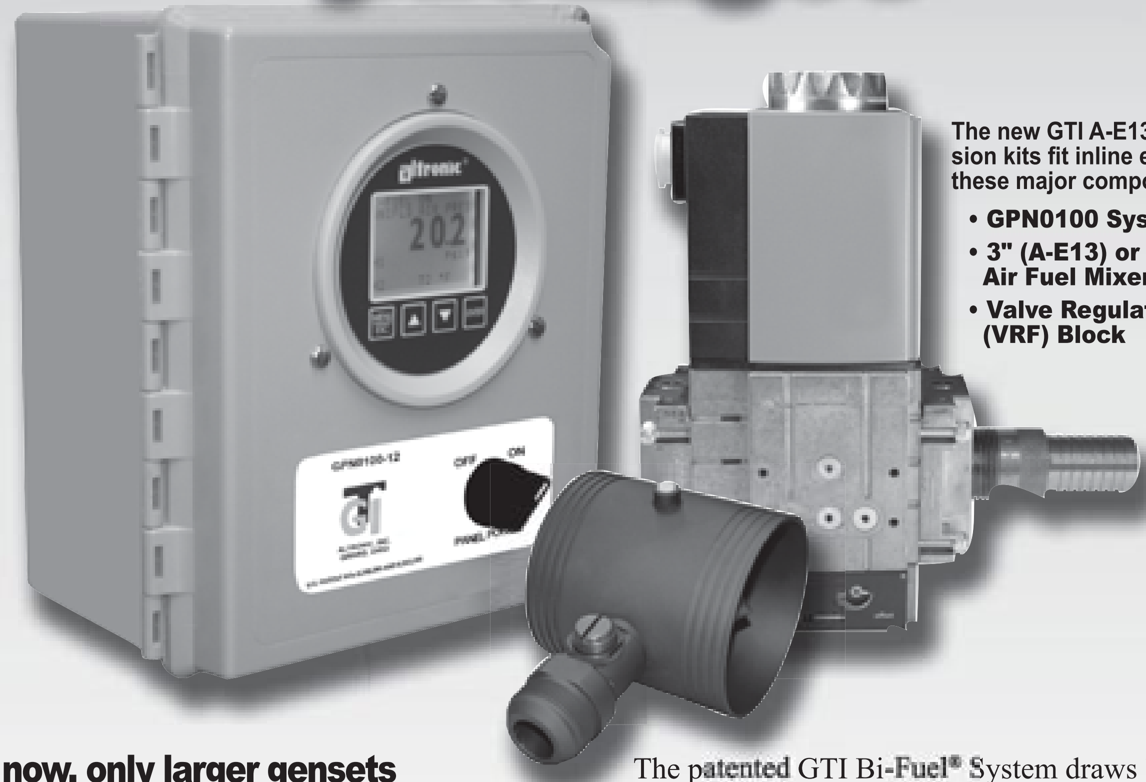

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sure the utility source is stable, the transfer switches re-transfer the emergency loads to the normal source.

When it came time to upgrade/expand the system years later, Bassett elected to stay with the provider "because we needed reliability and flexibility of control," says Middleton.

In 2004 Bassett Healthcare upgraded the controls of the paralleling and transfer gear installed in 1990-91 and added two medium-voltage gensets (2 MW each) capable of generating 12.47 kV. Installed on a primary bus, these are linked to and parallel with the three original gensets. For an overview of the system, see *Figure 1*.

With these upgrades, if the normal utility feed is not restored in five minutes, the equipment switches to the Bassett Healthcare system as the primary power source *(Figure 1)*. Special controls in the paralleling switchgear and transfer switches lock the equipment in the emergency position so it doesn't roll back to normal. Then, when a tie breaker is closed, the system

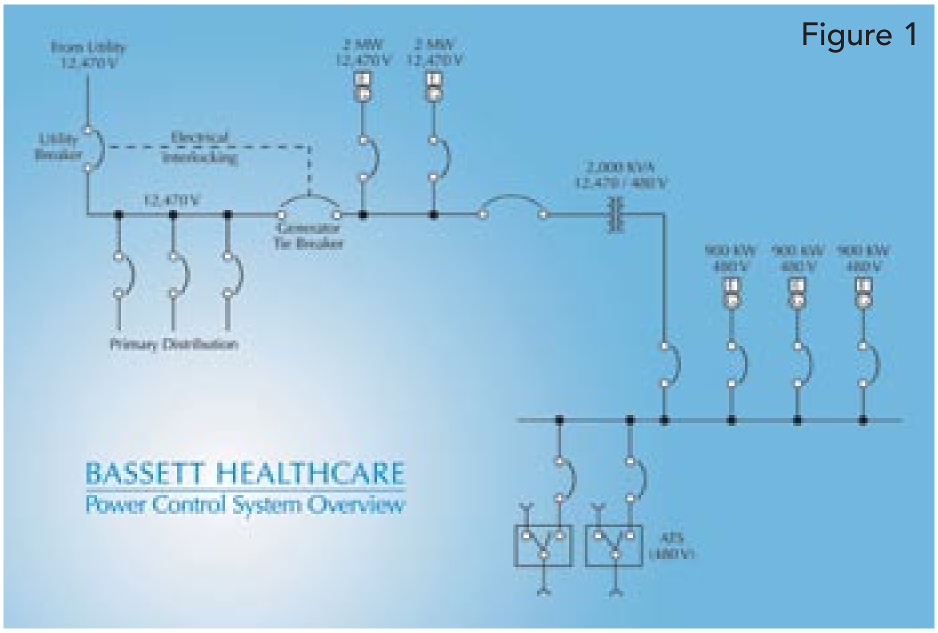

Figure 1

Bassett Healthcare's emergency power system is programmed for two stages. If the utility feed is lost, the switchgear transfers critical life/safety loads to three 480 volt generators. Five minutes later, if the utility feed is still unavailable, two 12,470-volt generators kick in, restoring full power to the hospital and 15 other buildings. When the outage is over, the system gradually retransfers power to the utility in the reverse order — first from the two larger generators, then from the three smaller ones.

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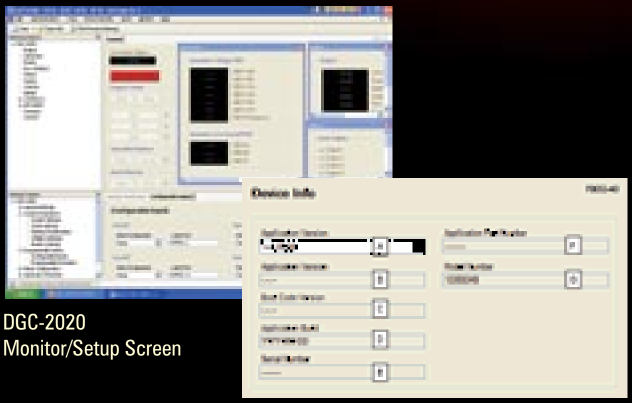

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begins back-feeding through a 2000 kVA transformer (480 volts secondary, 12.47 kV primary) to generate enough primary power to feed the entire Cooperstown campus.

> Our employees have become accustomed to continuous full power; they become very anxious with any transient outages. We're seriously considering adjusting the timing circuit to reduce the delay from five minutes to just two minutes.

"In a sense, we've spoiled people," says Middleton. "Our employees have become accustomed to continuous full power; they become very anxious with any transient outages. We're seriously considering adjusting the timing circuit to reduce the delay from five minutes to just two minutes."

When the normal supply voltage returns, the system, after a preset time delay, transfers all building loads, in the selected transition mode, back to the normal source. Once initiated, the retransfer sequence occurs in two stages. In the closed transition mode, the 12.47 kV generators synchronize with the utility power source, close the 12.47 kV utility breaker, transfer the load gradually to the utility source, and then open the 12.47 kV generator tie breaker. Once the 12.47 kV generators have transferred their load, the switchgear controls allow the 480 V transfer switches to retransfer to their normal position. The engines will continue to operate unloaded for a cool-down period. All controls are then automatically reset, in readiness for the next operation.

The switchgear can also be programmed for baseload peak-shaving. Thanks to a lucrative agreement between Bassett Healthcare and the regional power company, Bassett's backup power system pays for itself over time. An "interruptible power contract" gives the utility permission to drop Bassett Healthcare from the regional electrical grid (with advance notice) during periods of peak demand. In return, the utility pays Bassett, at a rate much higher than what Bassett pays for its normal feed, for every megawatt Bassett Healthcare generates while off-line.

"It's great for us," says Middleton. "We're off the grid for a few hundred hours a year, mostly in the summertime, when the power we generate is of higher quality than what we get from the utility. It's rock-solid, with stable frequency and voltage. But on the grid, with all the air-conditioning demands, we see large switching transients as new power sources are switched in and out." Bassett Healthcare also has the capacity to export power to the grid, although they have never been asked to do so.

Middleton makes sure he has 45,000 gallons of less-polluting, low-sulfur oil

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Designed with peak-shaving capabilities, the switchgear allows Bassett to drop off the grid during peak load periods and even to return power to the utility in periods of excessively high regional demand.

stored on site for the generators. The two largest generators consume 280 gallons an hour when operating — 6,720 gallons every 24 hours. With the three older, smaller generators operating concurrently, Bassett Healthcare could burn 8,000 to 10,000 gallons of oil a day just to power the main campus. Due to improvements by the manufacturer (Caterpillar), Bassett Healthcare's two newest generators—the largest ones—produce fewer emissions together than one of the original generators purchased in 1990. All of Bassett Healthcare's generators are rated and permitted for continuous use if necessary. Today, in addition to the main facility, every Bassett Healthcare clinic has its own automatic transfer switch for backup power. Bassett Healthcare maintains 30 generators in all.

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On-Line Emergency Power and the 2006 International Building Code—How Far Have We Come?

By Richard C. Berger

It seems almost odd that Mother Nature—the essence of peace, tranquility and warmth—has a darker side that literally defines the fundamental nature of what our industry is all about—surviving an emergency. In the November/December 2005 issue of *Powerline*, I discussed one aspect of that "darker side:" earthquakes. The passage and implementation of the IBC-2006 adds three others: **wind, flood and snow**. We also now add a related document, ASCE 7-05, volume 7, published by The American Society of Civil Engineers in 2005. If we thought our lives, responsibilities, duties and liabilities impossible before, read on!

IBC-2006 primarily affects the **"essential facility."** A classification of structure based on its building function, this group (known as Occupancy Category IV) is intended **to remain "operational" in the event of extreme environmental loading from wind, flood, snow or earthquakes.**[1] A host of health-related facilities is included in this category—from hospitals to possibly nursing homes and adult care, to schools and sports arenas serving as emergency preparedness centers, communication and some data processing centers, utilities, certain airport structures and municipal complexes to name but a few. *(Editor's note: see IBC 2006 Section 1604.5 noted as Table 1604.5 below.)*

Section 13.1.3 of the ASCE and IBC Section 1602

To the world at large **"operational"** is defined as "serviced or declared fit for proper functioning"[2]. To those of us within the power generation industry, operational means that wind, snow, floods or earthquakes shall not prevent an emergency-power installation from starting—and running—in the event of an emergency. In the paragraphs that follow, we will examine what that means and the tasks that must be accomplished to achieve that for which the codes, specifications and insurance companies are now holding us responsible!

Two last notes before we begin. The International Building Code, years 2000, 2003 or 2006, is the structural handbook for the building. As of this date, it has been adopted in all 50 states of the United States of America. The 2006 edition is the state building code in 23 of those states. This article touches on the information within Chapter 16, Structural Loads and sections 1608, 1609, 1612 and 1613—snow, wind, flood and earthquake loads, respectively.

This discussion, although focused on the "essential facility," is also partially applicable to many construction projects, Occupancy Category II-III, office buildings to institutions for seismic events, and all construction projects (same categories) from hospitals to restaurants where the forces incurred are from wind, floods or snow.

Protecting the Essential Facility (The Plan)

Any project begins with a concept, an understanding of what we're going to do and how we're going to do it. Let's begin with **floods and Flood Loads, Section 1612.**

The much debated, argued, referenced, talked about Hurricane Katrina and the City of New Orleans is pertinent once more. Even though it was a hurricane, wind took a back seat to flood conditions. The insurance industry is still sorting matters out and may not recover from that event for quite some time.

The target of this discussion focuses on the "essential facility"—hospitals and emergency preparedness centers to name a

Table 1604.5 Occupancy Category IV of Buildings and Other Structures

Buildings and other structures designated as essential facilities, including but not limited to:

- Hospitals and other health care facilities having surgery or emergency treatment facilities.
- Fire, rescue and police stations and emergency vehicle garages.
- Designated earthquake, hurricane or other emergency shelters.
- Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response.
- Power-generating stations and other public utility facilities required as emergency backup facilities for Occupancy Category IV structures.
- Structures containing highly toxic materials as defined by Section 307 where the quantity of the material exceeds the maximum allowable quantities of Table 307.1.(2).
- Aviation control towers, air traffic control centers and emergency aircraft hangars.
- Buildings and other structures having critical national defense functions.
- Water treatment facilities required to maintain water pressure for fire suppression.

A Flood Insurance Rate Map defines both flood hazard areas and risk premium zones.

few. The New Orleans Superdome comes to mind as the latter. Located in one of the lowest points in the city, basement and grade level flooding of that structure was a virtual certainty when the levies gave way. It may sound cynical but guess where the emergency power systems, their panels, distribution and fuel source were located?

In the 2006 IBC Code, the term **FIRM** is used extensively. Known as the **Flood Insurance Rate Map** defined in section 1612, Flood Loads, this FEMA-developed community map defines both flood hazard areas and risk premium zones. In plain English, it locates within a community flood plain areas subject to a one percent chance of flood within 100 years and a community's own historical flood hazard map and creates the design criteria based on the more stringent of the two. It should also be noted that some insurance companies have extended the 1 percent/100 years to a 500 year period. Design requirements now include elevation of both site and non-structural components to prevent a recurrence of the human and economic disaster that was witnessed in the aftermath of Katrina.

The second term which is new to us is **High Velocity Wave Action.** Let's say that we are constructing a project near a shoreline in a **known flood hazard area** as illustrated on a FIRM map. The project has several levels, one of which is subject to a wave many feet high capable of scaling that first level. In so doing, components located at that location are not only subjected to flood load but are also subjected to the weight of that wall of water bearing horizontally, vertically or both on a fixed component. In this instance, unless the affected unit or units are protected, additional anchorage and structural integrity will be needed to help deter this aspect of flood damage.

The real question is: what do these terms mean to us?

As manufacturers or designers, we are not about to make or require our components to be submersible. Since liability is the issue, the discussion is information, education and the ensuing project design. Component specifications and literature need to include proper warnings to the design team that components must be placed in suitable flood-free locations, physically protected and anchored if necessary. Those locations must also be defined. The absence of such information can be construed as an error of omission, courtesy of the new code. As a result, sales teams must now be armed with enough knowledge and understanding to serve as the consulting engineer's consultant on matters of electrical generation power, not just for product performance but for product emergency performance as well!

We need to understand that economics and practicality will dictate the location of our components. Perhaps the roof or an enclosed penthouse might make more sense than a grade or below grade location. Suitable weather and wind protection might be a less expensive alternative to the total elevation of all related emergency components. While this last point might seem the province of the consulting engineer, it is in everyone's best interest that a project's budget is met, especially in this economic environment.

Lastly, the project's drawings and specifications must adequately reflect a flood plan that will result in the insurability of the building, the absence of which would prove disastrous. To paraphrase one of the nation's most prominent insurance company's design manual concerning floods, "**the operation can continue without interruption.**" That sounds strangely familiar to the IBC CODE requirement for flood as it relates to an "essential facility!"

Wind Loads, Section 1609

Typically we think of the wind as a structural issue—one that does not really affect our product or design. Our work concerning roof- and outdoor-mounted components is complete once we have relayed weight information to the project's structural engineer. As with all else in this article, the IBC-2006 not only puts an end to that thinking but also levies an awesome responsibility on us as well. Like floods and snow, but unlike earthquake loads, **wind affects all construction, everywhere in the United States.**

The changes imposed by Section 1609, Wind Loads and ASCE 7-05 can best be categorized as follows:

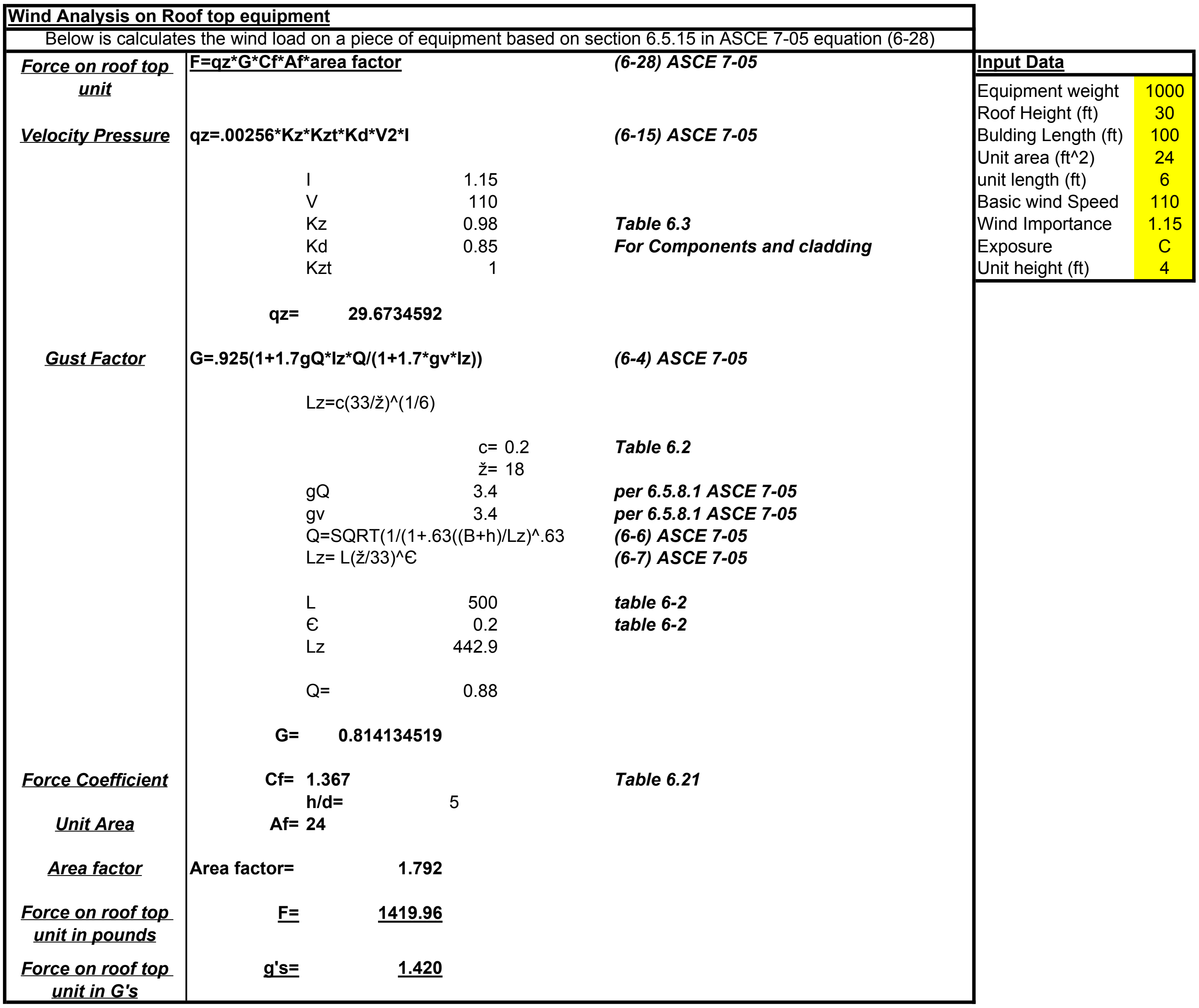
- Changes to the Codes;
- Changes to the Structure;
- Changes to Anchorage;
- Changes to the Manufactured Component.

In the last several years, the insurance industry has been plagued by commercial claims of roof-mounted equipment landing on doorsteps. State after state has experienced this somewhat universal problem. As a result, both the building codes and building insurers view roof-mounted installations in an entirely new way. IBC-2006 has increased the actual calculated wind load throughout the United States by nearly 20% due to a more realistic view of how the wind blows. Entitled **3-second gust,** this approach is more concerned with wind peaks than with the constant velocity norm. Additionally, most coastal states have earned the title of **Hurricane-Prone Regions.** As such, buildings located within one mile of the mean high watermark where the basic wind speed is 110 mph or greater have also earned the title and design restrictions of **Wind-Borne Debris Region.** This new category bears some similarity with "**high velocity wave action**" in that roof-mounted components require not just an enhanced anchorage but must also be able to withstand the damage created by another dislodged component.

While these changes are significant, **it is the ASCE 7-05 document** that presents the **greatest challenge** to our industry. Entitled **Rooftop Structures, section 6.5.15.1** looks specifically at the **two loads** implied on roof-mounted components where the building height is 60' or less. The **first** is standard, the actual profile of the unit's largest exposed area multiplied by the new 3-second gust load in terms of pounds per square foot. The **second, the new and more critical load,** calculates the velocity of the wind as it moves along the ground, turning vertically up the side of the building and then shearing across the roof level. When both of these loads are combined, the resulting loads, both seen by the structure and the component, rival and in many cases exceed a significant seismic event.

In the example below, a typical 5kW emergency generator weighing approximately 1000 lbs was modeled sitting atop a 30' tall structure. The building, located near a coast line, had to withstand loads imparted by wind velocities approaching 110 mph, typical for coastal communities. As you review the model, you will see that the total wind exerted on the genset was almost 1420 lbs—nearly 1.4 times the unit's weight, more than enough to lift, move or overturn the unit. By comparison, an earthquake would have to log a 6.2 to 6.5 on the Richter scale to rival this load.

At first glance, we might not consider these loads a particular problem as the architect has provided a screen for our use to minimize wind load effects. If only that were true! In the IBC-2006 & ASCE 7-05 it is understood that the use of **screens, tall buildings**



Wind Analysis on Roof top equipment

Below is calculates the wind load on a piece of equipment based on section 6.5.15 in ASCE 7-05 equation (6-28)

Force on roof top unit	**F=qz*G*Cf*Af*area factor**	***(6-28) ASCE 7-05***
Velocity Pressure	**qz=.00256*Kz*Kzt*Kd*V2*I**	***(6-15) ASCE 7-05***
	I 1.15	
	V 110	
	Kz 0.98	***Table 6.3***
	Kd 0.85	***For Components and cladding***
	Kzt 1	
	qz= 29.6734592	
Gust Factor	**G=.925(1+1.7gQ*Iz*Q/(1+1.7*gv*Iz))**	***(6-4) ASCE 7-05***
	Lz=c(33/ž)^(1/6)	
	c= 0.2	***Table 6.2***
	ž= 18	
	gQ 3.4	***per 6.5.8.1 ASCE 7-05***
	gv 3.4	***per 6.5.8.1 ASCE 7-05***
	Q=SQRT(1/(1+.63((B+h)/Lz)^.63	***(6-6) ASCE 7-05***
	Lz= L(ž/33)^Є	***(6-7) ASCE 7-05***
	L 500	***table 6-2***
	Є 0.2	***table 6-2***
	Lz 442.9	
	Q= 0.88	
	G= 0.814134519	
Force Coefficient	**Cf= 1.367**	***Table 6.21***
	h/d= 5	
Unit Area	**Af= 24**	
Area factor	**Area factor= 1.792**	
Force on roof top unit in pounds	**F= 1419.96**	
Force on roof top unit in G's	**g's= 1.420**	

Input Data	
Equipment weight	1000
Roof Height (ft)	30
Bulding Length (ft)	100
Unit area (ft^2)	24
unit length (ft)	6
Basic wind Speed	110
Wind Importance	1.15
Exposure	C
Unit height (ft)	4

or blockage of any type or configuration to minimize these loads is unacceptable. In other words, the loads are imposed on the unit, regardless of any other condition with the exception of complete, three dimensional indoor mounting. The wind load **calculation** for our unit, isolators and height extending accessories such as day tanks and enclosures must therefore **include compression, shear, and moment** as well as the support on which they are installed! Additionally, all subcomponents of our exposed component must also be able to take these loads including lines, conduit, panels, radiators and their mountings.

Before we leave this topic and move on, we need to identify the structure that our component sits on as well. Often, the structural engineer provides us with a steel dunnage system which has been designed to encompass the above loads. On occasion, especially the smaller projects, **equipment supports** are used for the power equipment as well as their electrical switch, transfer or transformer counterparts. Two issues come to mind.

As of the date of code adoption, the roof's **metal deck is no longer considered a structural component of the building and cannot be fastened to.** All connections to the building are **structural** and must occur directly **to the building steel** below the metal deck. **Through-bolting or welding** are the only acceptable methods available to us. Thus in some way this connection when made will imply a point load on our equipment support unless we raise the building steel above the roof—a costly process. **For the most part, the typical equipment support as specified by the project's consulting engineer is not designed to accept point load!**

The second issue concerning this type of support is that of **affixing these products to our component.** Current equipment is supported via **attachment through lag bolts into a wood nailer**, an integral part of the product. The new wind load criteria might create some difficulties. Manufacturers of these systems must verify that they can accept not just compression but shear, tension and moment capability as well. Submittals should be accompanied by stamped PE calculations, testing or both in the state of the project's location if liability issues are to be avoided. In short, the industry needs to revisit what it is doing with outdoor or roof-mounted components, make the changes necessary and carry those changes through to project execution and completion. This is not the time to invite your favorite underwriter over to see the good work that you have done on a project unless this aspect—structural supports and connections—has been properly addressed!

One more brief discussion concerning wind need occur, that of tornadoes. As difficult as it is to believe, the discussion of tornadoes in the code has been left to the discretion of local community officials. Our concern is not with construction within the tornado's eye since little is left standing. Instead, our concern rests with those structures slightly outside of the eye which are called on to withstand sweeping cyclical high velocity wind events that history shows have a reasonable chance of surviving to some degree. Because strict definition of those forces is lacking and variations are polar, they are not code quantified. It is our job therefore to at least offer a level of protection that mirrors the higher wind loads charted by the IBC and design on that basis. In future codes, I believe this issue will be addressed.

Snow Loads, Section 1608

Perhaps of all of the foes represented in nature's darker personality, snow loads is the most difficult of the opponents to define. As you will see below, the unanswered questions define the problem and are likely to remain unanswered for some time to come.

"Snow loads" have been **included in the continued operation discussion** of an **"essential facility."** Here is what we know. Section 1609 of the IBC, "snow loads" defers to ASCE 7-05, chapter 7, "snow loads." Between the two, we can define snow-belt locations, roof building loads and associated weights with that load when we look at the interaction of snow and how it affects the structure. When it comes to snow's additional interaction with our component, the clouds move in rapidly. Here are some of the unanswered questions:

- Does the snow add to the weight of our component or will the wind blow it off?
- If the snow does add to the unit's weight and there is a partial snowmelt and then a refreeze, what percentage of weight is added to our component due to the more compacted frozen section?
- If the snow is frozen atop our unit, what is the calculated height that we should be working with on buildings less than 60' overall? Our component now has an increased height, taller profile and a much increased wind load imposed by ASCE section 6.15.1 all of which is acting on a substantially larger exposed area challenging both anchorage and support.

Within the code, "roof projections," paragraph 7.8[4] appears to be the category that identifies a component exposed to a snow load imposed by drift. If the component is less than 15' long, it is not to be considered. Using that as our guide, we begin with larger components only and their accompanying enclosure(s) if they are so housed. Most transformers or separated transfer switches are considerably smaller in overall size and therefore not of concern. There is however some ambiguity as these components are vital to our generator's operation; therefore, in the writer's opinion, they require at least a rudimentary review.

As this portion of the building code is so new as to how it affects our components, there are few substantial analyses or guidelines to work with—just questions. To that end, our VMC Group, licensed to practice Engineering in the State of New Jersey, has taken on the task of determining some of those effects and within the months to come will have some, if not all, of the answers.

Earthquake Loads, Section 1613

Beginning with the introduction of the International Building Code in 2000, earthquakes and their effects on non-structural building components have led the discussion and debate concerning **continued component operation**. Our industry first met this code with indifference followed by disbelief and finally today, eight years later, with action and a partial plan. We have more to go! With the adoption of one of the three IBC code years by all 50 states and nearly every government agency, the IBC-2006 edition takes on enormous significance and impacts our product lines in ways that few preceding codes have ever done. From construction managers to specification writers to insurance companies and building owners, no code has so dramatically driven our requirements and our design. **No code has also made dependence on one another so clear.** Perhaps we should begin with an explanation of this station and look at some of the changes!

Code Changes

Section 13.2.3 and ASCE 7-05, Consequential Damage: "The functional and physical interrelationship of components, their supports and their effects on each other shall be considered so that the failure of an essential or non essential architectural, mechanical or electrical component shall not cause the failure of an essential architectural, mechanical or electrical component."

Originally mixed with other sentences in the 2000 code, the 2006 edition has given this criteria its own identity with a separate paragraph, numbered and spaced to highlight the importance of the statement. Simply put, what we do and provide is only as good as the other components within the chain. Should anything in that chain in an "essential facility" not work, if it is an associated component provided by us and it fails, the liability is ours. To the **manufacturer that means that the total package requires compliance**. It also means that our installation literature needs to be addressed to cover all aspects of that installation including our components, isolators, supports, external attachments or hardware including pipe and conduit, bracing, and anchorage just to name a few. To the designer it means that they need to work with compliant manufacturers, have solid specifications and details as part of the bid package and an accompanying "Statement of Special Inspections," (section 1705) when and where a special inspector is a project requirement.

> From construction managers to specification writers to insurance companies and building owners, no code has so dramatically driven our requirements and our design.

IBC-2006 & ASCE 7-05: for our purposes, the 2006 Code is really two documents. Unlike the earlier 2000 edition which was essentially "self contained," the basics pertaining to building types, earthquake design, etc., may be found in section 1600 of the 2006 Code. The nuts and bolts and their application are well defined in the related text (ASCE 7-05). We return to the IBC when we need to understand Structural Tests & Special Inspections, Section 17.

Section 1604.5 Occupancy Category: The term "occupancy category" replaced "seismic use group" to reflect the new requirement for inclusion and applicability of considerations for **snow, wind and flood** as well as **earthquakes** for a building's functional design. This table reorganizes the building classifications into a more sensible, orderly, logical progression from "Category I" (the least important; i.e., a dead storage facility) to the **highest of importance, the "essential facility," Category IV!**

Sections 13.2.1, 13.2.2, 1702.1, 1707.9 and 1708.5,[5] Designated Seismic Systems, (Certification)

One almost needs to be a code nerd to understand this paragraph. The shift between the IBC and ASCE 7-05 shown above leaves many an opening to fall and stumble on. All five referenced sections target a specific group of components necessary to keep the word "essential" lit up and powered continuously without interruption. In essence once the debate is over, the code offers manufacturers three methods of determining "on line capability" for their component. They are:

- **Finite Element Analysis,** also known as FEA;
- **Historical evidence,** also known as experience data;
- **Shake table testing**, also known as "if it works after the test it passes."

The first and the third methods are, in the writer's opinion, legitimate and accurate means of determining performance under duress. As I have already stated in ***The Seismic Guidebook***,[6] the second method leaves much to anyone's imagination. When the paragraph concerning experience or historical data is reviewed (Section 13.2.6[7]), we see words like "based upon nationally recognized procedures acceptable to the authority having jurisdiction." What comes to mind immediately is **"what nationally recognized procedure?"** I have read several position papers on this very issue and have yet to find a single individual or organization who lends credence to this method of testing. That is probably why I have not reviewed any testing program by any manufacturer using experience or historical evidence as their basis of compliance.

Section 13.6, Mechanical & Electrical Components, Table 13.6.1 Seismic Coefficients for Mechanical and Electrical Components

The table referenced in 13.6.1 has tremendous implications for manufacturers and designers alike. Two issues are at hand. First, a_p., known as the amplification factor. Components that are rigidly mounted (no isolation internally or externally) are considered rigid and therefore have an amplification of 1.0 or no effect on the load in terms of pounds that the component will see. Components such as emergency generators are typically factory- or field-isolated. By code, their amplification factor increases by a factor of 2.5, adding significantly to tested loads.

The second issue concerns snubbing or limiting the motion of the isolation system. Should the snubbers or restraining system used in conjunction with the isolators come into contact after traveling in excess of ¼", the resulting force regardless of calculation is two times (2X) the resulting load which could prove catastrophic for the component manufacturer's efforts to obtain and continue compliance. This points to the need to purchase proper isolation components.

Section 13.6.4. Electrical Components

This entire section refers to electrical components having an I_p, "importance factor" greater than 1.0. Since all emergency generation power has an I_p of 1.5, all eight (8) of the paragraph's provisions are applicable. Let's highlight several of the more critical points using the numbering system that appears in this section.

2). Loads imposed on the components by attached utility or service lines that are attached to separate structures shall be evaluated. This is a design issue that must be addressed by the project's electrical and structural engineer to determine if seismic drift between two structures will place an unacceptable load on the component. If it does, proper contract detailing must include limiting of that load either by flexible components, loops or other acceptable practices. The equipment component manufacturer must have clear installation information on both shop drawings and I&O manuals to advise of this requirement or he will share in the liability of failure.

4) Internal coils of dry transformers shall be positively attached to their supporting substructure within the transformer enclosure. Transformers, a critical part of the electrical process, are for the most part presently isolated from their enclosure with minimal isolation systems such as isolation washers or small elastomeric mounts. Unless this design has taken seismic issues into account, the present through-bolting of the coil to the frame is not considered positive attachment. Isolator deflection (even though minimal) requires additional snubbing due to the increase of acceleration loads allowing bolt failure. Manufacturers of these components need to rapidly address this issue.

6) Electrical cabinet design shall comply with the applicable NEMA standards. Cutouts in the lower shear panel that have not been made by the manufacturer and reduce significantly the strength of the cabinet shall be specifically evaluated. This message is very clear. Field alterations must not be permitted to manufacturer's components without written authorization from the manufacturer. I&O manuals as well as shop drawings must reflect this warning.

7) The attachments for additional external items weighing more than 100 lbs (445N) shall be specifically evaluated by the manufacturer. This issue greatly affects component compliance for emergency generator product manufacturers. Often, the component manufacturer produces the raw power plant and the dealer has the option of installing accessory items. These add ons could be minimal and pose a minor impact or they could be major accessories with an enormous impact such as enclosures and day tanks. The problem is extensive as the industry practice of dealer supplied and sometimes installed accessories is the norm rather than the exception. There is probably a series of minimum design and structural standards for these accessories that can be set by the component manufacturer and issued to their sales network to help alleviate this problem. In order to do this, the manufacturer needs to assign the task to someone (more than likely they'll assign the analysis to their compliance agency).

8) Where conduit, cable trays or similar electrical distribution components are attached to structures that could displace relative to one another and for isolated structures where such components cross the isolation interface, the components shall be designed to accommodate the seismic relative displacement defined in section 13.3.2. This impacts the electrical and structural engineer, component manufacturer and the installing contractor. Let's see why!

Buildings subject to seismic loads are additionally subject to horizontal movement along their vertical "Y" axis from floor to floor. Known as **displacement**, these offsets from one floor to another can place uncomfortable loads on any vertical component that extends from one floor to another and is attached in any way. Those loads can cause distortion, failure or both for the component that is experiencing those loads and the component to which the vertical link is attached or connected! The responsibilities are as follows:

- The project's structural engineer must define the displacement from floor to floor and give that information to the electrical engineer of record.
- The electrical engineer must issue on plans and specifications details and specs to both show and describe the allowable methods of handling that displacement.
- The component manufacturer must state in his submittal and I&O manual the inability of the component to accept displacement loads. Additionally, the I&O manual should reflect suggested installation practices to help guide the installing contractor with what he must do.
- Finally, the installing contractor must recognize that displacement is the norm rather than the exception. It is his responsibility to look for that installation detail and perform no installation unless he gets one.

How far have we come? I will try to answer that question. ***We have yet to graduate to a yardstick!*** That statement is based on new recent projects both under design and in development. Take data centers for example. The new design standard for this type of project incorporates the term **"mission critical"** and other terms like **"24/7" to denote the "on line" requirement of the facility,** joining hospitals, emergency preparedness centers, 911 call centers and outpatient facilities within the "essential facility category." I have found that the concept of "on line" is not truly understood nor is the owner obtaining what he thinks he wants: "continuous operation, no matter what."

Aside from the normal design issues such as fuel storage and operation duration, the design basics of Section 16 still need to be addressed. These include:

- Proper detailing of entering services to accommodate seismic drift through the foundation wall including fuel for the generator.
- Grade or sub grade locations for emergency power and distribution in known or possible flood locations.
- Improper detailing of sub steel and adequate supports for components mounted at roof or grade level to accommodate wind loading.

Add to this the more difficult code requirements of component testing compliance and labeling as well as code acceptable accessory packages and what we have is a project that will neither work 24/7 nor qualifies as an "essential facility."

On the positive side there is both progress and inertia. Manufacturers are rapidly moving to meet the new criteria, trying to stay ahead of the insurance standards and checklists that are about to come. Unfortunately literature and how to's are still lacking as the information highway and professional organizations are slow to react. There are design standards but few design manuals which translate requirements and solutions into basic English for anyone except a degreed structural engineer. Even our own SGMEC® Newsletter Program, which is a free information source for consulting engineers and manufacturers alike, has not had the acceptance we hoped for.

I believe the biggest problem can be summed up with an old cliché: Too much to do, not enough time in which to do it! We are making progress, but we need to make more!

To conclude, for now, a quote from our "Seismic Guidebook" might be in order. "Change is often not negative. The passage of the International Building Code is one example of a positive change whose time has come. Like anything that is new, there will be problems at first. Patience, common sense and a desire to work as a team have always been a winning combination."

Richard C. Berger is a frequent lecturer on Seismic Building Codes for non-structural building components in many states. He is a certified AIA/CES Registered Provider and his multi-state "Seismic Guidebook" is used by building code officials and industry designers alike. He has also designed and patented a series of products-which are industry standards. Mr. Berger is a partner in VMC East, a sales agency for vibration and seismic control systems and Chairman of the VMC Group, Vibration Mountings & Controls, Inc., Korfund Dynamics and Aeroflex International Isolators, manufacturers of seismic, shock, isolation, noise and bomb-blast protection products.

Footnotes

[1] IBC 2006 Section 1602 Definitions & Notations "Essential facility".

[2] American Dictionary 1984 edition

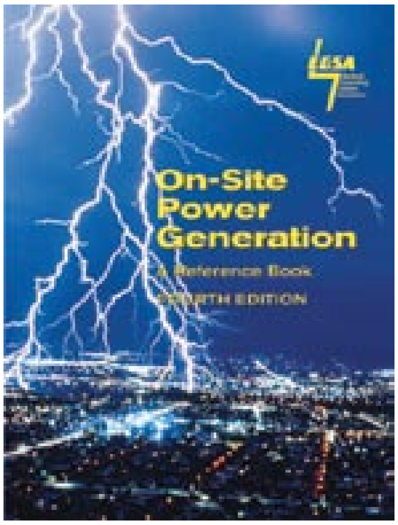
[3] The SGMEC Newsletter Program, is series of electronic code based Newsletters which are designed and developed to keep the reader up to date on the most recent construction code requirements concerning the International Building Code and its effects on the non-structural building components as they relate to wind, floods, snow and earthquakes.

[4] ASCE 7-05

[5] IBC 2006

[6] "A Seismic Guidebook, A Multi-State Training Manual for Non- Structural Building Components." A distributed training manual which embodies a pragmatic, common sense approach and has emerged as an industry standard text, since its premier publication in 1990.

[7] ASCE 7-05



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For complete information on EGSA's On-Site Power Schools—including a schedule and registration materials—and full details on our Continuing Education program, visit us at *www.EGSA.org*.

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Email us at e-mail@egsa.org
Visit us online at www.EGSA.org

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McPherson Controls, Kutai Electronics Break Ground

McPherson Controls and Kutai Electronics, global players in the design and production of Automatic Voltage Regulators, Engine Governors, Automatic Transfer Switches (ATS), and ATS Controls, has announced a new joint venture to build a state-of-the-art distribution center to service clients across North, Central and South America. The 25,000 square foot facility, located in Miami, Florida, USA, will be fully operational in December 2008. The new center will also boast manufacturing and testing capabilities.

For over 15 years, McPherson Controls and Kutai Electronics have partnered to offer innovative and affordable electronics used by the power generator industry. Our combination of experience and expertise has made us indispensable suppliers of Automatic Voltage Regulators, Engines, Governors, ATS, and ATS Controls.

McPherson Controls is headquartered in Miami, Florida, USA and has reported over $15 million in sales for 2007. They are the leading innovators in research and design of electronic components for power generation. The privately held firm was founded in 1993.

Wärtsilä Delivers Power Plant Extension for Saudi Arabian Firm

Wärtsilä Corporation has signed an agreement with Riyadh Cement Company (RCC) to deliver a second power plant for their new cement plant expansion in Saudi Arabia. The agreement was signed in May 2008. The turnkey delivery is scheduled for completion by mid-2010 and follows an earlier Wärtsilä power plant delivered to the same customer, which became operational in early 2007.

This extension order consists of five Wärtsilä 20V32 generating sets that will run on heavy fuel oil. They will produce 38 MW of electricity to be used for powering RCC's second production unit.

The site is located 835 meters above sea level and has an ambient air temperature of 50°C. The 20-cylinder Wärtsilä engines were chosen because of their reliability in operating under such extreme site conditions.

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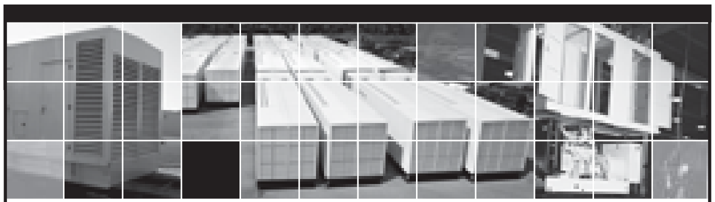
The rapid growth of construction projects in Saudi Arabia, together with the country's infrastructure development, has created a huge demand for cement. RCC was one of the first companies serving that market, with the capacity to produce 5000

Continued on next page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tons per day.

Wärtsilä has been powering industries in Saudi Arabia for 35 years with more than 1200 MW of power plants installed, under construction or on order. Close to 400 MW is utilized or earmarked for the expanding cement industry in the country. For further information, visit *www.wartsila.com*.

Saft receives new lithium battery order from the Australian army

Saft has received an AUD $3.5 million (approx. USD $2.7 million) order from the Australian Defence Materiel Organisation for BA-F300 lithium-sulfur dioxide batteries, with deliveries scheduled to begin later this year. The BA-F300 battery is a custom battery comprised of Saft LO 26 SX cells and is designed to withstand the demanding electrical and mechanical conditions encountered in combat and military training exercises. The batteries will be used to power a variety of portable military equipment, including Raven radios.

Saft manufactures three primary lithium battery technologies (Li-SO2, Li-SOCl2, Li-MnO2) as well as rechargeable Li-ion, and has more than 30 years experience in developing lithium batteries for military customers.

Saft is the world's leading manufacturer of nickel-cadmium batteries for industrial applications and of primary lithium batteries for a range of end markets. For more information, visit *www.saftbatteries.com*.

GE Provides Control Technology for New Biomass Power Plants in China

GE Energy is providing distributed control systems for 50 new biomass-fueled power plants that are being built in China as the country works to rapidly develop new renewable energy sources to meet its pressing energy and environmental goals.

The biomass plants will provide much-needed electricity to support local grid networks at a time when China's demand for power is projected to grow by about 13.5% in 2008, with the country's total annual demand currently exceeding 3.7 trillion kilowatt hours (kWh). The 50 plants will each feature two, 12MW power blocks that will generate a total of 7.2 billion kWh per year, which is enough to support an average of 70,000 families in China.

GE is providing its distributed controls technology to Wuhan Kaidi Electric Power Engineering Co., Ltd., which is building the biomass plants in the Hubei, Hunan, Anhui, Shanxi, Fujian, Jiangsu and Jiangxi regions. Rice husk, straw and animal manure will be used as the biomass stock.

The projects will mark the global debut of GE Energy's OC 4000™ distributed control systems (DCS) for biomass power generation applications. The integrated controls platform will link all plant operations, data acquisition and performance analysis to control and protect the biomass plants' steam turbine, boiler and auxiliary devices. A simulation system will be provided for operating and maintenance training. The DCS technology will optimize the performance of the plants, making the projects more economically viable for developer Wuhan Kaidi.

Continued on page 45

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EGSA's mission is to bring together representatives of the various segments of the On-Site Power Industry, to learn, share ideas and experiences, advance the science of On-Site Power generation, improve performance and profitability of members, and the quality of service to power users.

1. Contact Information

Please type or print all information in upper and lower case (NOT ALL CAPS!)

Company _

Address __

City ____________________ State/Province ____________________

Zip/Postal Code ____________________ Country ____________________

Phone ____________________ FAX ____________________

Official Representative ____________________ Title ____________________

Representative's E-Mail ____________________ Company's Web Address ____________________

How did you hear about EGSA? ☐ Web site ☐ *Powerline* magazine ☐ Colleague ☐ POWER-GEN ☐ Other ____________________

Why are you joining EGSA? ☐ Certification Program ☐ CEU Program ☐ Power Schools ☐ Buyers Guide Listing ☐ Other ____________________

2. Member Classification

Read the Membership classifications below and check the box that describes your firm's classification.

I. FULL MEMBERSHIP

☐ MF **Manufacturer Membership**
Any individual, sole proprietor, partnership or corporation seeking membership must apply for a Full Membership as a manufacturer if they meet one or more of the following criteria:

1. They manufacture prime movers for power generation.
2. They manufacture generators or other power conversion devices producing electricity.
3. They manufacture switchgear or electrical control devices.
4. They manufacture or assemble generator sets, UPS systems, solar power, hydropower, geothermal, or any other power production or conversion system including related components or accessories for national or regional distribution.
5. They are a wholly owned subsidiary of a firm which qualifies under rule one through four.

☐ DD **Distributor/Dealer Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a distributor or dealer for products listed under Manufacturer Membership may apply for Full Membership as a Distributor/Dealer. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

☐ CI **Contractor/Integrator Membership**
Any individual, sole proprietor, partnership or corporation actively engaged as a Contractor or Equipment Integrator of products listed under Manufacturer Membership, not brand by brand, geographic territory or contractually obligated as a Distributor/Dealer of a specific product. These firms typically purchase products from a Distributor/Dealer, Manufacturer or Retailer, adding value through installation, product knowledge, relationships, unique services, etc., and then re-sell the resulting product to an end-user.

☐ MR **Manufacturer's Representative Membership**
Any individual, sole proprietor, partnership or corporation actively engaged in the representation of products listed under Manufacturer Membership may apply for Full Membership as a Manufacturer's Representative. If an organization qualifies under Manufacturer Membership, it is not qualified under this section.

☐ EM **Energy Management Company Membership**
Any individual, sole proprietor, partnership or corporation engaged in energy management, including Energy Service Companies (ESCOs), Independent Power Producers (IPPs), Integrators, Aggregators, and other similar enterprises may apply for Full Membership as an Energy Management Company.

☐ **Associate Full Membership** (mark appropriate category at right)]
Any individual, sole proprietor, academic institution, student, partnership or corporation meeting the requirements of Associate Regular Membership may apply for Full Membership at their option to enjoy the privileges of Full Membership, including the rights to vote and to serve on EGSA's Board of Directors. Initiation fees and annual dues will be assessed at the existing non-manufacturers' Full Member rates.

II. ASSOCIATE REGULAR MEMBERSHIP

☐ AA **Trade Publication Membership**
Any trade publication dealing with the electrical generating systems industry or its suppliers may apply for Associate Membership—Trade Publications.

☐ AB **Trade Association Membership**
Any trade association made up of individual or company members sharing a common interest in the electrical generating systems industry may apply for Associate Membership—Allied Associations.

☐ AC **Engineer Membership**
Any consulting or specifying engineer may apply for Associate Membership—Engineer. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AD **End-User Membership**
Any individual employee of a company who owns or operates electrical generating equipment and/or related switchgear or components, whose responsibility to his employer includes planning, design, installation, supervision, or service of such equipment may apply for Associate Membership—User. Membership may either be held in the employer's name or individual's name under this classification. Individuals whose employer qualify as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AE **Service Membership**
Any individual, organization or academic institution that offers services such as research, testing or repair to the electrical generating systems industry may apply for Associate Membership—Services. Membership may either be held in the individual's name or the organization's name under this classification. Individual companies whose employer or parent organization qualifies as a Full Member, as described in the Full Membership section, do not qualify for this category.

☐ AG **Educational Institution Membership**
Any postsecondary vocational-technical school or college offering on-site power generation-related instruction may apply for Associate Membership-Education Institution.

☐ AR **Retiree Membership**
Any individual who retires from a member company may apply for Associate Membership—Retired. This classification does not apply to any individual who is employed more than 20 hours per week.

☐ AF **Student Membership**
Any individual currently enrolled at an academic institution may apply for Associate Membership—Student.

Application for Membership – page 2

Dues Schedule (Use for Section 3)

	Annual Dues	Initiation Fee	TOTAL
Manufacturer	$825	$200	$1025
Energy Management Companies	$825	$200	$1025
Distributor/Dealer	$285	$100	$385
Contractor/Integrator	$285	$100	$385
Manufacturer's Rep	$285	$100	$385
Regular Associate Member	$200	$100	$300
Full Associate Member	$285	$100	$385
Retiree Member	$90	$0	$90
Student Member	*Complimentary*	$0	$0

NOTE: A FULL 12-MONTH DUES PAYMENT MUST BE RECEIVED WITH THIS APPLICATION. The Association's Membership Year is January 1 through December 31. Dues payments that extend beyond the first Membership Year will be applied to the second year's dues.

FULL PAYMENT MUST BE RECEIVED WITH APPLICATION.

3. Membership Dues (Please fill in the appropriate TOTAL amount from the above dues schedule.)

Membership Dues $__________

Membership Plaque (optional)** $ 39.95**

On-Site Power Reference Book (optional)** $ 125.00**

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5. Products/Services

Please describe the nature of your business (50 words or less, NOT ALL CAPS). If you are a Manufacturer's Representative or Distributor, please indicate for manufacturers you represent and/or distribute for; if a student, please provide name and location of your school, your major and your anticipated graduation date:

____

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____

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____

Do you buy AND sell equipment? ☐ Yes ☐ No

Do you manufacture packaged equipment? ☐ Yes ☐ No

Available Codes:

01 ---Batteries/Battery Chargers
02 ---Control/Annunciator Systems
29 ---Education
30 ---Emission Control Equipment
04 ---Enclosures, Generator Set
05 ---Engines, Diesel or Gas
06 ---Engines, Gas Turbine
07 ---Engine Starters/Starting Aids
08 ---Filters, Lube Oil, Fuel or Air
28 ---Fuel Cells
03 ---Fuel Tanks and Fuel Storage Systems
09 ---Generator Laminations
10 ---Generator Sets
11 ---Generators/Alternators
12 ---Governors
13 ---Heat Recovery Systems
14 ---Instruments and controls, including meters, gauges, relays, contactors, or switches
15 ---Load Banks
16 ---Motor Generator Sets
17 ---Radiator/Heat Exchangers
18 ---Relays, Protective or Synchronizing
19 ---Silencers/Exhaust Systems/Noise Abatement
20 ---Solenoids
21 ---Swtichgear and Transfer Switches (Automatic or Manual), Bypass Isolation Switches, and/or Switchgear Panels
22 ---Trailers, Generator Set
23 ---Transformers
24 ---Uninterruptible Power Supplies
25 ---Vibration Isolators
26 ---Voltage Regulators
27 ---Wiring Devices or Receptacles

Enter codes here:

Products sold: ______________

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Products rented: ____________

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Products serviced: ___________

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6. Sponsor(s)

: A"Sponsor" is an EGSA Member who interested you in filling out this application. It is not mandatory that you have a sponsor for the Board to act favorably on this application; however, if a Member recommended that you consider membership, we request that individual's name and company name for our records.

Sponsor Name ______________________________Company Name ______________________________

7. Official Representative's Authorization

Signature ____Date ______________________

Continued from page 42

The first 2x12MW biomass power block is scheduled to enter commercial service at the end of August 2008. All 50 plants will be operational by December 2010. GE's equipment will be built in Shanghai, China. The equipment for the first two project contracts will be delivered in May 2008, with three additional shipments scheduled in June, July and August 2008. Local suppliers in China are providing the steam turbines and boilers for the biomass plants, while seven engineering institutes are also involved with the design of this project. For more information, visit the company's Web site at *www.ge.com*.

GT Exhaust Systems Changes Its Name to GTE Industries, Inc.

GT Exhaust Systems, based in Lincoln, Nebraska, announced today the change of its name and rebranding to GTE Industries, Inc. (GTE). The official public announcement will come after an internal unveiling planned for August 14, 2008. GTE Industries is launching its new brand to communicate the change in name, philosophy and business strategy as it strengthens its position as a global leader in the emission and sound solutions industries.

The new brand comes in response to the new owner and management team working together to offer:

- Internal restructuring to better serve its customers
- Increased solution offerings through its broadened product lines
- Enhancements in customer service to support its global customers with plans for additional international customer service centers and a newly updated website

Partnering with and offering our customers, not products, but solutions for the sound and emissions challenges they bring is our primary target. Our customers and our sales channel can expect enhanced solutions, superior customer service and a significant commitment to the environment. We're proud of the foundation laid by GT Exhaust Systems and have identified new opportunities, changing to build a different, stronger company."

Offering solutions for a cleaner, quieter world, GTE is also making environmentally-conscious changes in the way it operates. Some of these include the move towards decreasing paper usage and electronic data initiatives while partnering with companies to develop the cleaner, more cost effective solutions.

A global leader in sound and emissions solutions, GTE Industries manufactures solutions for sound attenuation, emission control and heat challenges. Originating as the go-to for silencers in the United States, GTE has since expanded its solutions to span the globe—offering silencers, catalytic converters, diesel particulate filters, accessories and other products throughout. For more information about GTE Industries, visit *www.gteind.com*, call (800) 775-2466 or email Douglas Twyford at *dtwyford@gteind.com*. ■

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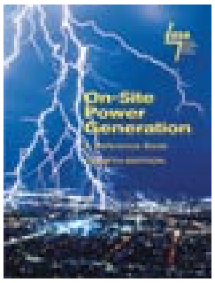

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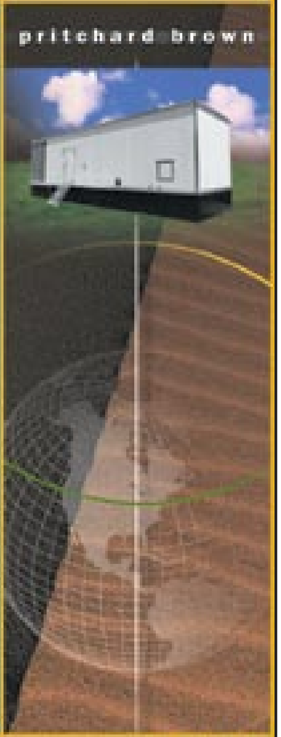
EGSA Electrical Generating Systems Association



Stay on Top of Your Game with EGSA's Electrical Generator Systems Technician Certification Program

Think things move pretty fast in today's business world? Think how fast they'll be moving one, five or even 10 years down the road. That's why you need every advantage to stay on top.

It's no secret that technology is becoming more complex—not less—and that makes today's On-Site Power Generation System a lot more expensive. End-users—your customers—don't want just anybody with a basic knowledge of mechanics to install and maintain their equipment. They want to be confident that all work has been performed by qualified personnel. Suppliers want assurance that skilled technicians are performing maintenance and repairs to guard against unnecessary returns or warranty repairs.

As Good as Your Word

In the past, your word was the only assurance that your technicians are skilled and knowledgeable. But now, through EGSA's Electrical Generator Systems Technician Certification Program, there is a way that you can back up those words with objective evidence of your technicians' proficiency.

EGSA offers you a big advantage: For the first time in our industry, we have an objective and accurate way to determine generator technician proficiency. That means that the same standards will be used to measure the skills and knowledge of technicians from Maine to Manitoba and Mexico. Yes, Manitoba and Mexico! EGSA has determined that there is no reason why the test could not be fairly applied to any NAFTA technician.

What are the Benefits?

For the Employer, certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs. And everyone will be comfortable knowing that your certified techicians' expertise has been confirmed by *the* industry organization through a program that was developed by a university. Encouraging and helping your technicians become certified signifies your commitment to the highest of standards. Plus, it lends an added level of credibility to your firm and can sharpen your competitive edge. Employing certified techs will promote customer satisfaction and you won't have to be shy about offering assurance that your techs are qualified. Certification can also help you select potential new hires, analyze job performance, evaluate employees and motivate technicians to enhance their skills and knowledge.

Think about the message that certification sends to those with whom you do business. Why would anyone want a technician who isn't certified performing critical maintenance or repair tasks? Employing certified technicians gives you an added tool with which to market your business.

As our members have said, "We've seen too many backyard mechanics damage expensive equipment. This program will provide credibility for my company and will help build pride and a commitment from technicians to be the best."

For the Technician

Certificate holders benefit too. Certification shows employers, clients, and associates that you are committed as a professional. It provides recognition of your knowledge and skill, shows your commitment to your profession and can help with job advancement. Certification is a mark of excellence that you carry with you everywhere you go.

Acquiring certification indicates that you have the knowledge and proficiency required to perform as an Electrical Generating Systems Technician professional. Becoming certified can increase your salary, enhance your skills, and make your job more satisfying.

EGSA CERTIFIED®
ELECTRICAL GENERATOR SYSTEMS TECHNICIAN

Certification helps ensure that your technicians have the critical knowledge and skills to succeed in their jobs.

The Certification Test

EGSA collaborated with Ferris State University to develop the certification test and program. Through a scientific process, our panel of technical experts identified 12 duty areas (such as "Basic Electricity") and 61 tasks (such as "demonstrate knowledge of AC electrical theory") within the duty areas. The duty areas and tasks were ranked and rated in terms of their relative importance, the frequency with which a task is performed, and skill level (i.e. Senior/Expert; Intermediate; and Entry Level.) All this data was combined to develop the certification test that was then statistically validated through a pilot test taken by generator technicians from across the United States.

Who can take the Test?

There are no pre-qualifications for taking the EGSA Certification test. We recommend three or four years of field experience before taking the test. Technicians who have had formal education in On-Site Power Generation (a degree or certificate from a technical school or community college) may need less field experience. Those who pass the test will have a comprehensive knowledge of basic electricity, the functions of a gen-set's mechanical and electrical components, the interactions and relationships among components and an understanding of various elements of the installation, service, maintenance, and repair of gen-sets and On-Site Power Generation Systems.

CERTIFICATION TESTING COVERS:

- *Automatic Transfer Switches*
- *Communication & Documentation*
- *Engine Generator Instrumentation & Controls*
- *Multiple Generator Switchgear & Controls*
- *Troubleshooting System Problems*
- *Auxiliary Support Systems*
- *Basic Electricity*
- *Prime Movers*
- *Governors*
- *Voltage Regulators*
- *Generators/Alternators*

Use the Study Guide to Prepare!

Use of the program's Study Guide is an excellent way to help techs prepare for the test and should clearly indicate if they are ready to take (and pass) the certification exam. In addition to useful formula pages, the guide contains almost 200 multiple choice practice questions that cover all parts of the certification test. In addition to identifying the correct answer, the guide also indicates in most cases why a particular choice is correct and why the others are incorrect. The Guide also identifies resource material where techs can get additional or more in-depth information about a given topic.

Need more information? Visit *www.egsa.org* to find extensive and detailed information about the certification program. Or contact EGSA Director of Education George Rowley via e-mail at *g.rowley@egsa.org*.

DISCLAIMER OF LIABILITY

Certified status is an indication that an individual has completed a combination of defined education, experience or examination requirements. However, Certification is not a guarantee or assurance of the competence or ability of any particular individual. Further, given the rapid changes in the field, the Electrical Generating Systems Association cannot warrant that the Examination and other Certification materials will at all times reflect the most current state of the art. The Electrical Generating Systems Association disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the Certification Program or the acts or omissions of any person who has been Certified by the Electrical Generating Systems Association. In conducting the Certification Program, including issuing Certifications, the Electrical Generating Systems Association is not undertaking to render professional or other services for or on behalf of any person or entity, nor is the Electrical Generating Systems Association undertaking to perform any duty owed by any person or entity to someone else. Anyone using the services of a person who has been Certified should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

EGSA JOB BANK

Sales Engineer

Ransome Cat, Caterpillar Dealer for PA, NJ and DE is searching for an experienced Sales Engineer for their Power Generation Sales Division. This position will influence end users, engineers and contractors to select Caterpillar as their source for power generation products and services. Responsibilities to include: Identifying new bids for future projects; Assisting with system design, application assistance, budget and project price quotations; Assist with submittals, track projects and provide support to Engineers and customers regarding projects. Must have five years engine sales/power generation application experience and a 4 year college degree is preferred. If you are interested in becoming a part of our team, please e-mail resume to HR@ransome.com. Fax: 215-245-2914. www.ransome.com AA/EEO

SALES ENGINEER

KELLY GENERATOR & EQUIPMENT, INC., has an immediate opening for an Sales Engineer. We are located and operate in the mid-Atlantic region: Delaware, Maryland, Northern Virginia, West Virginia and Washington, DC. The successful candidate will train, educate, and provide technical support to contractors and Electrical and Design Engineers for the company's products. Interface closely with engineering personnel to educate them about the company's innovative products such that Engineers adopt these products within their published specifications and work with a motivated outside sales team and inside sales support staff. B.S. in Mechanical or Power Engineering preferred. Strong presentation and effective communication skills for conducting presentations. Project management experience. Sales Experience a plus. Send resumes to: *dkelly@kge.com* or FAX 410-257-5227

Generator Field Technician

A fast growing Utah based standby power company has an opening for a full-time field technician to perform routine generator and transfer switch preventative maintenance, troubleshooting, repair work, and startups. Prior field experience in the generator standby power industry is required. Must have a good driving record, be clean cut, and be drug free. Competitive wage, benefits, company cell, and company truck are available for a qualified individual. Please fax resume to 801-544-7010.

EMERGENCY POWER SYSTEM SPECIALISTS

Generator Technician—Experienced

Emergency Systems Service Company in Quakertown, PA, a leading provider of emergency generator sets, has an immediate opening for a technician with a minimum of three years diesel engine/generator set background/experience. Responsibilities will involve troubleshooting, repair and the planned maintenance services of generator sets and peripheral equipment. A neat appearance, clean driving record and good people skills are required. We offer a highly attractive compensation with an outstanding benefits package. A company vehicle and additional training provided. If you are interested in becoming part of our team, please call **(215) 536-4973, ext. 25.**

Generator Technician–Apprentice

Emergency Systems Service Company in Quakertown, PA, a leading provider of emergency generator sets, has an immediate opening for a person with a strong mechanical/electrical background interested in a career in the power generation service field. Responsibilities will involve minor troubleshooting, repair and the planned maintenance services of generator sets and peripheral equipment. A neat appearance, clean driving record and good people skills are required. An outstanding benefits package, company vehicle and additional training provided. If you are interested in becoming part of our team, please call **(215) 536-4973, ext. 25.**

Generator Field Technician

KELLY GENERATOR & EQUIPMENT, INC., has an immediate opening for a Generator Technician. We are located and operate in the mid-Atlantic region: Delaware, Maryland, Virginia, West Virginia and Washington, DC. Must have a High School Diploma (Vocational or GED), a minimum of 3-5 years experience servicing industrial generator sets and associated equipment. Must be able to service, repair and troubleshoot the engine, as well as the alternator end of the equipment. Begin work with little or no supervision. MILITARY A PLUS! We offer factory training on the lines we represent as well as "in house" training. Full benefits include a company vehicle, medical, dental, vision 401(k) and profit sharing. FAX resumes to 410-257-5227 or e-mail to *contactus@kge.com.*

Generator Service Technician

Emergency Power Systems, Inc. in Tulsa, OK has an immediate opening for a technician with advanced knowledge of standby generator systems, including automatic switchgear, diesel and gaseous-fueled engines and all associated components and subsystems. EPS has had a strong regional presence since 1991 in sales, service, rental, custom designs and turn-key installations of standby power systems. Pay commensurate with skills and experience. Send resume via email to *rhaynes@epstulsa.com* or fax to Ron Haynes at 918-446-2411.

Power Systems/Sales Position

Baltimore/Washington to call on contractors and engineers to represent local MTU distributor, located in the Middle River, MD area. Power Systems experience preferred. Excellent salary and benefits for the right person. EOE. Fax resume to 410-687-4743 or email to *hrogers@johnsontowers.com.*

Generator Field Technician

PM Technologies, LLC has several immediate openings for Generator Technicians. We are located and operate in Michigan, Ohio and Northern Indiana. High School diploma or equivalent a must. Military experience a plus. Must be able to troubleshoot and repair the engine (diesel and gaseous) as well as the generator end. Customer interaction will be required on a daily basis. We need highly motivated, self sufficient people to assist in growing our expansion efforts at new branch locations. Benefits include company vehicle, 401k, health, dental and vision coverage's as well as paid bonuses for new account procurment. Please Fax resumes to 248.374.6408 or email to *dpopp@pmtech.org*

Generator Set Sales/Service

Experienced sales/service engineer needed by southern California company to sell engine generator sets.
Please respond to *J.Kellough@EGSA.org*
(Reference PLND06JB-1).

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EGSA Job Bank Guidelines—EGSA will advertise (free of charge) EGSA Member company job openings in the Job Bank. **Free use of the Job Bank is strictly limited to companies advertising for positions available within their own firms. Companies who are not members of EGSA and third-party employment service firms who service our industry may utilize the Job Bank for a $300 fee.** Blind box ads using the EGSA Job Bank address are available upon request; company logos may be included for an additional fee. EGSA reserves the right to refuse any advertisement it deems inappropriate to the publication. Please send your classified ad (limited to about 50 words) to: EGSA Job Bank, 1650 S. Dixie Hwy, Suite 500, Boca Raton, FL 33432. Or, send it via e-mail it to: *J.Kellough@EGSA.org*

Are You a Member of EGSA?

You should be! Members of the Electrical Generating Systems Association enjoy access to a wide range of membership benefits that EGSA has to offer! These include **discounted fees** for:

- EGSA Technician Certification Program
- On-Site Power Schools offering Continuing Education Units (CEUs)
- EGSA Conferences and Conventions
- *Powerline* magazine advertising
- The *EGSA On-Site Power Reference Book*

Plus....

- **Free job postings** in our Job Bank, located on our Website and in our bi-monthly publication *Powerline*.
- **Use of the EGSA logo** on your company advertisements, website, stationery, etc.
- **Priority booking** of your booth in the EGSA Pavilion at POWER-GEN International! Space for the 2008 show is STILL AVAILABLE! For information, contact Liz Bustamante at *L.Bustamante@EGSA.org*
- **EGSA Bucks Program**—You can participate in EGSA's member-referral program: If a new member lists your name as a sponsor on their membership application, you will receive $100 in "EGSA Bucks" to apply towards any EGSA product including: Registrations, reference books, membership renewal dues, etc.
- **Industry data**—Access to EGSA's quarterly generator shipment survey.
- **Listing in EGSA's Annual Buying Guide** (distributed to *Diesel Progress* recipients, currently over 29,000 readers!) Don't forget: Your company's branch locations can receive full listings in our Annual Buying Guide for a nominal fee without purchasing a separate membership for each branch (we will list the city, state and country of each branch for free) Please visit *http://www.egsa.org/publications/buyersguide.cfm* for details.
- **Web links**—Your company information will appear on EGSA's website within the month that you join, and we will link to your website if it was listed on your membership application.
- **Networking opportunities**—make contacts with the "Who's Who" of the On-Site Power industry at EGSA events, including conferences, conventions, trade shows and receptions.

Complete membership information is available on our web site at *www.EGSA.org*. If you have any additional questions or needs, don't hesitate to contact us! Call (561) 750-5575 or email Liz Bustamante at *L.Bustamante@EGSA.org*

NEW EGSA MEMBERS

MF=Manufacturer DD=Distributor/Dealer CI=Contractor/Integrator MR=Manufacturers Rep
EM=Energy Management Co. AA=Trade Publication AB=Trade Association AC=Engineer
AD=End-User AE=Service AG=Educational Institution AR=Retiree AF=Student

Alliant Energy - Industrial Energy Application . . . . (AC)
Cedar Rapids, IA
(319) 721-5552 Fax: (319) 355-0141
Contact: Derek G. Abrams, Senior Electrial Engineer
Business: We provide on-site standby generation for area businesses as a proactive way to mitigate the risk of unexpected power failure.

Blue Star Power Systems Inc. . . . . (MF)
Lake Crystal, MN
(507) 726-2508 Fax: (507) 726-2670
Contact: Bruce Prange, COO
Business: We are an engine gen set manufacturer.

CK Power . . . . (DD)
St. Louis, MO
(314) 868-8620 Fax: (314) 868-9314
Contact: Scott Joachimstaler, Sales Manager
Business: CK Power is a distributor of Kohler Company/Kohler Power Systems. CK Power operates in Missouri & Illinois. We specialize in prime, standby, mobile and marine generator applications. We field a capable power systems service fleet.

E.I. Williams Industries. . . . . (MF)
Ajax, ON Canada
(877) 840-3347 Fax: (877) 385-3920
Contact: Jim Williams, CEO
Business: Canadian manufacturer & design of silencers, catalytic converters and noise enclosures. Acoustical louvers, blankets, radiators, heat exchangers, vibration isolators.

F3 & I2 Solutions LLC . . . . (AC)
Troy, OH
(937) 418-6555
Contact: Jeff Hunter, President
Business: Design of innovative solutions for packaging of power-gen systems.

Simplex, Inc.. . . . . (MF)
Springfield, IL
(217) 483-1600 Fax: (217) 483-1616
Contact: Thomas Debrey, President
Business: Manufacturer of load banks for testing, maintenance and performance proving of engine generators, UPS and other AC and DC power sources to 5,000 kW, low and medium voltage. Manufacturer of fuel supply systems, including day tanks, pump spts, tank filling systems, digital controls.

TitanX Engine Cooling, Inc.. . . . . (MF)
Jamestown, NY
(716) 665-2620 Fax: (716) 665-7105
Contact: Edward Moore, Director, Sales
Business: Design, develop and manufacture engine cooling products for heavy duty diesel applications. Products include radiators, charge air coolers, condensers, oil coolers, modules and systems.

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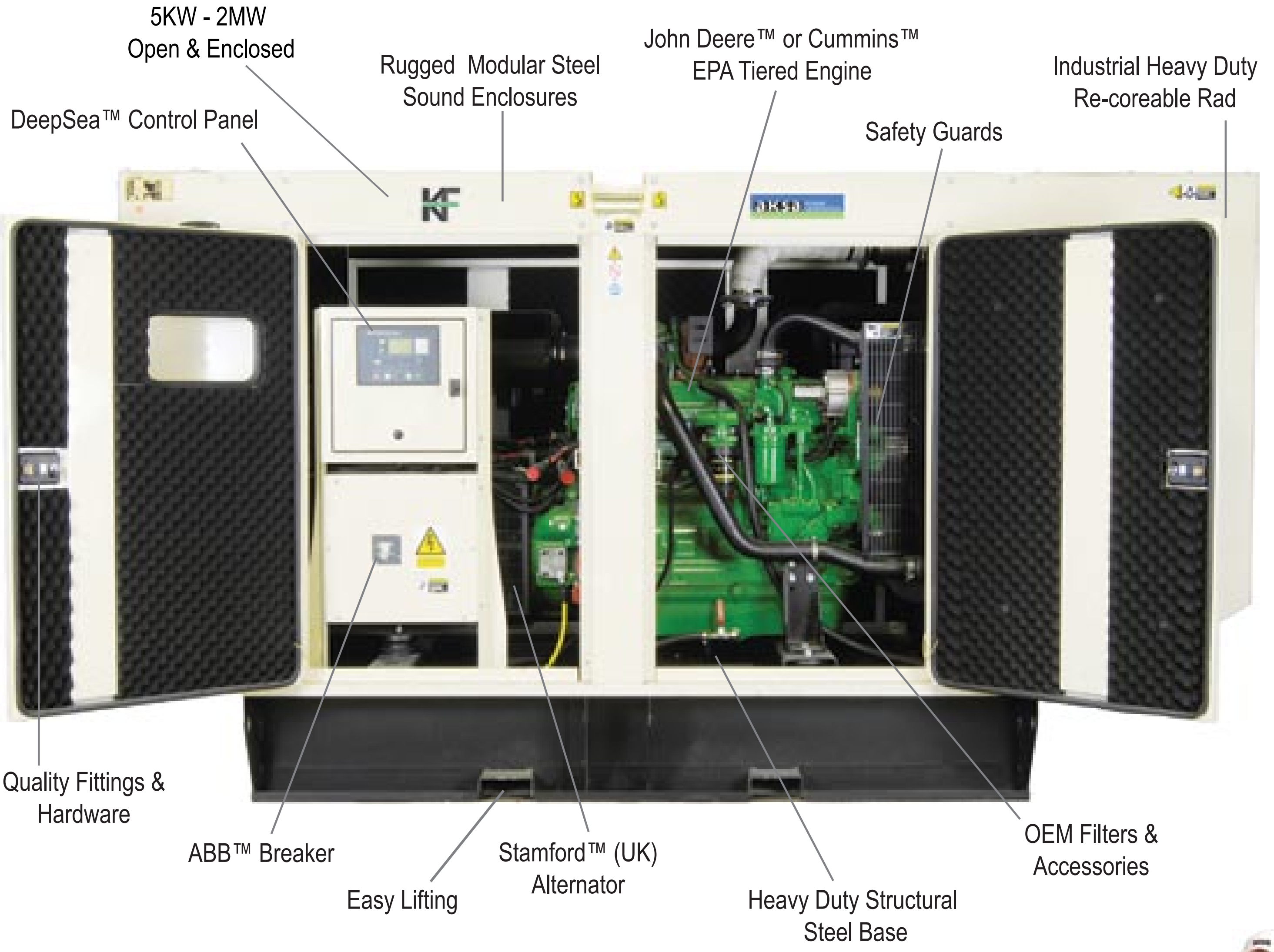

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